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FINAL FIELD OPERATIONS PLAN:

Field Sampling and Analysis at the Asbestos Dump Site—Passaic, NJ

Work Assignment No. C02070

Prepared for
U.S. Environmental Protection Agency
26 Federal Plaza
Emergency and Remedial
Response Division
New York, New York, 10278

Submitted by
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October 26, 1990

ALLIANCE
Technologies Corporation

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1.0 INTRODUCTION

This Field Operations Plan (FOP) has been developed to document all activities to be completed during the sampling and analysis component of EPA Work Assignment C02070. It also serves to provide background information for Alliance project team members. This assignment requires the collection of soil data at two parcels of land associated with the NPL Asbestos Dump site located in southeastern Morris County, Meyersville, NJ.

This document includes a general overview of the sites to be investigated, a quality assurance plan and a health and safety plan. This document follows EPA guidance relevant to remedial investigations at Superfund sites. Background information for these sites was obtained from memoranda prepared by EPA personnel and a draft remedial investigation report prepared by Fred C. Hart Associates (May 27, 1987). Several site maps present in the FOP were taken directly from the draft RI report.

1.1 Site Background

The Asbestos Dump Site is a National Priority List Site which includes four properties located in southeastern Morris County, New Jersey. These four properties are the Millington Site, the Dietzman Tract, the New Vernon Road Site, and the White Bridge Road Site. The Asbestos Dump Site project was divided into two operable units. A Record of Decision (ROD) for the Millington Site was signed on September 30, 1988. Negotiations for implementation of the remedial action were unsuccessful. EPA has issued a unilateral order to the PRP, National Gypsum Corporation. National Gypsum is currently conducting the remedial design. The Millington site is the first operable unit. The subjects of the second operable unit are the Dietzman Tract, the New Vernon Road Site, and the White Bridge Road Site. In August 1990, EPA sampled the New Vernon Road and White Bridge Road sites as part of a Removal Assessment Program. The results indicate the presence of chrysotile asbestos in soils at levels up to 5 percent. EPA transmitted this data to the Agency for Toxic Substances and Disease Registry (ATSDR) for review. ATSDR is in the process of issuing a

Health Advisory which calls for the relocation of affected residents and abatement of the risk posed by the asbestos contamination. EPA has initiated this Work Assignment to further characterize the New Vernon Road and White Bridge Road sites. Additional soil data is needed to evaluate the various remedial options for these sites.

1.1.1 Site Locations/Descriptions

White Bridge Road Site

The White Bridge Road Site is located in Meyersville, New Jersey and consists of approximately 12 acres of land off New Vernon Road and bounded by the Great Swamp National Wildlife Refuge to the east and south, and private residences to the north and west. The address is 651 White Bridge Road. There are two residents living on-site and 18 horses reportedly boarding in stables at the site. There are five other residences on White Bridge Road (between New Vernon Road and Great Swamp), within approximately 700 feet of the site. One of them is directly across the street.

The site consists of a two story building where the owners reside, a garage, and several sheds and stables that are used for the horses (see Figure 1). The roadway on the northwest side of the site, leading to all of the above structures, is paved with asphalt. There is a large, grazing field for the horses in the center of the site which takes up the majority of the property. A pond, approximately 100 feet in diameter, is situated in the northern portion of the grazing field. Trees line the property along White Bridge Road. The riding track is approximately 250 feet long by 125 feet wide and is situated approximately 350 feet from the house and stables. The dirt roadway is approximately 250 feet long.

According to the draft Remedial Investigation (RI) report, the White Bridge Road site has asbestos contamination in the eastern section of the property and along the main driveway. The main landfill area consists of the area south of, and including, the riding track and a

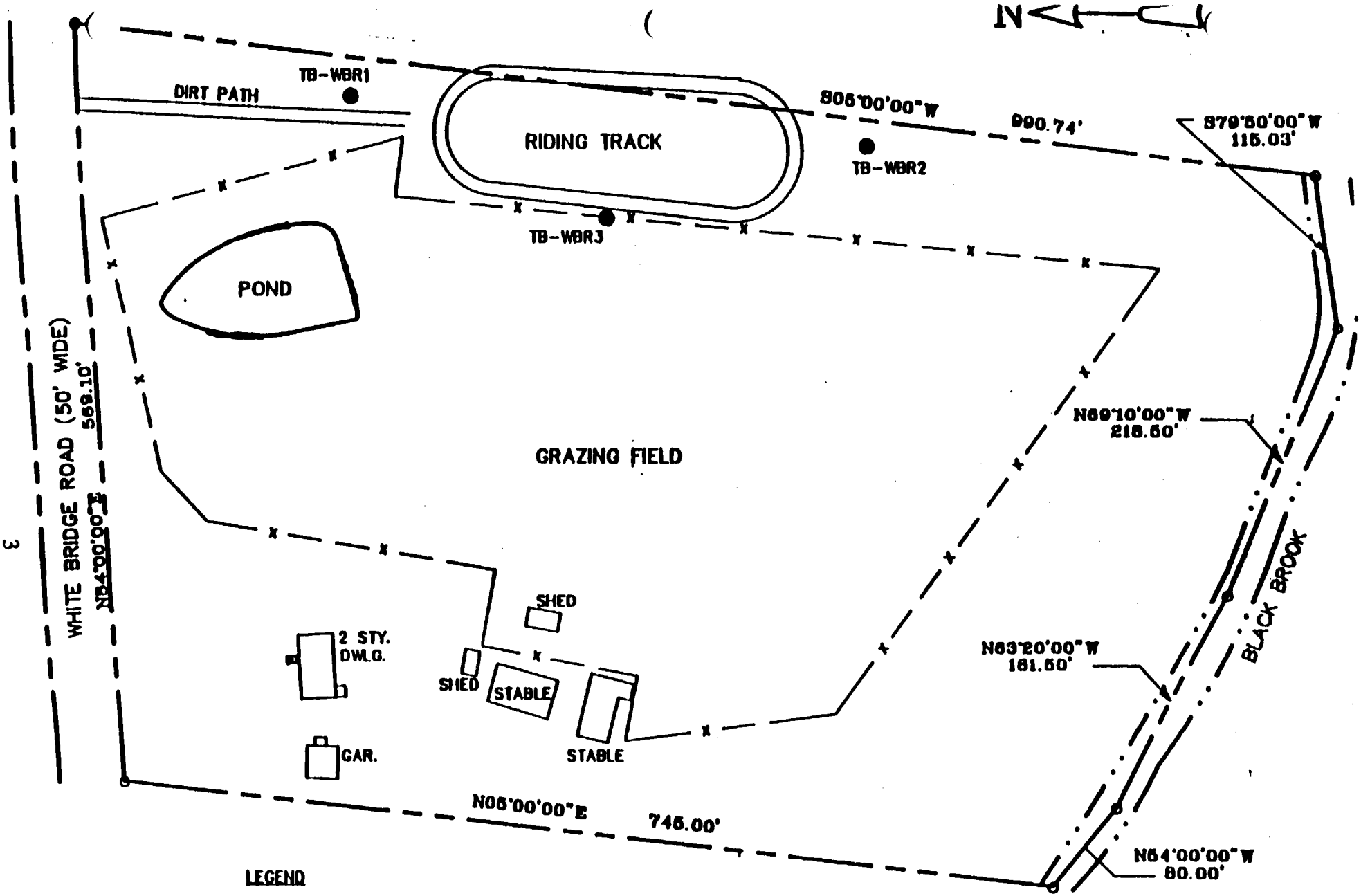

Figure 1. White Bridge Road Site.

small portion of the grazing field. The depth of the asbestos wastes averages between two to four and one-half feet. Towards the southeastern corner of the site it is reportedly (by the owner) to be at least 10 feet deep. The asbestos appears to be most exposed and friable on the riding track, where it has been pulverized and mixed with dirt by the horses. During dry periods, the material is easily made airborne with ordinary walking.

The dirt roadway consists of small asbestos chips that have been worn and crushed from repeated usage. The eastern portion of the grazing field adjacent to the riding track also contains pulverized asbestos mixed in with the soil. Further west into the field, chips are found in the grass. Along the southern end of the riding track and towards the south larger pieces (6-12 inches) of asbestos tile are visible at the surface.

New Vernon Road Site

The New Vernon Road Site is located in Meyersville, New Jersey and consists of approximately 30 acres of land off New Vernon Road. The address is 237 and 257 New Vernon Road. There are two residences either adjacent to or across the street from the site. There is also a tennis club (large ballooned enclosure) directly across the street.

The majority of the site is grassy and well maintained. The front of the property shows no evidence of the past fill area. The house on the site is located adjacent to the east-west driveway which almost bisects the property (see Figure 2). This driveway extends to the east approximately 1,000 feet into an open area (main landfill area). The fill area is approximately 200 - 300 feet long. This area is cluttered with tree trunks and logs. Prior to reaching the open area, the driveway branches to the north, approximately 200 feet, where the owner has a tree servicing business. The business maintains several large trucks and a two story building. Another driveway exits the property from this operation on the northwest corner. Most of the access roads on the property have been paved.

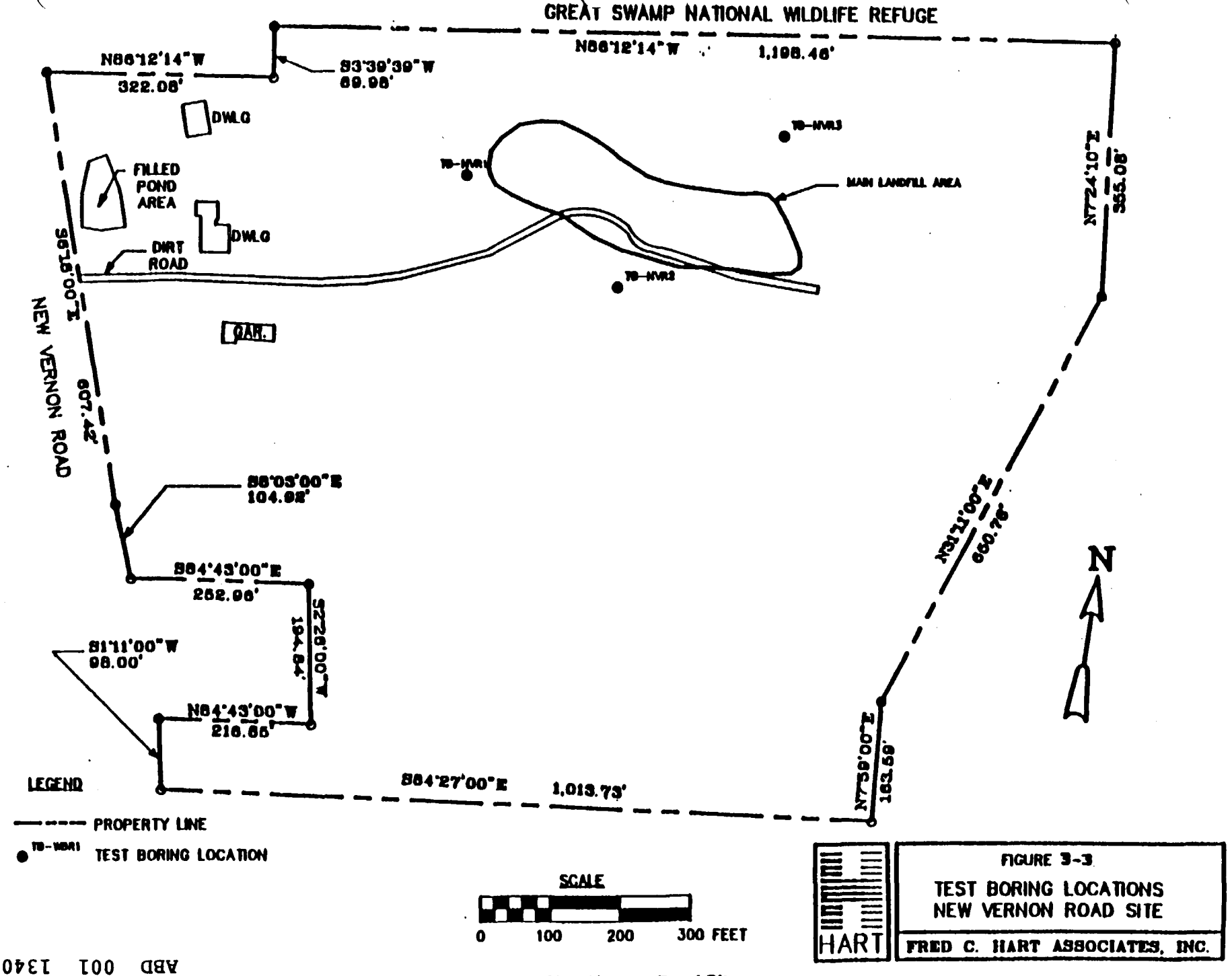

Figure 2. New Vernon Road Site.

According to the draft Remedial Investigation (RI) report, the New Vernon Road Site contains asbestos wastes in a small landfill area in front of the private resident, in the main landfill area in the center of the property, along the dirt driveway that traverses north-south along the middle of the property, and in the area of the shed located next to the private residence. The depth of the waste is not known.

The main driveway adjacent to the house and leading from New Vernon Road to the tree service building has been recently paved. Previously, it contained gravel, dirt, and asbestos tile chips. At the main landfill area toward the back of the property, the driveway is covered with wood chips. The old shed located approximately 100 feet south of the main house is currently undergoing demolition, as it contained asbestos shingles and friable asbestos material.

Asbestos tile chips are found in the soil, grass, and gardens around the houses, as well as further back in the property near the driveways. The paving of the driveways and removal of the shed are important in controlling airborne asbestos releases. However, the potential for release still exists due to the presence of the tile chips around the property.

1.1.2 Site History

The White Bridge Road and New Vernon Road Sites are satellite sites of the NPL Asbestos Millington Dump site. In September 1983, the U.S. EPA Emergency Response and Hazardous Materials Inspection Branch reviewed site conditions for removal eligibility. The site was addressed by the EPA through a 106 Order issued by the U.S. EPA on April 4, 1985, which required National Gypsum to perform a Remedial Investigation/Feasibility Study (RI/FS) on the entire Asbestos Dump. Subsequent to issuance of the Order, it was deemed appropriate to split the work into two operable units. The RI for operable unit two has been conducted (1987), however, it has not been approved by the U.S. EPA Remedial Response Program. Further activities have not been conducted for operable unit two.

In August 1989, the U.S. EPA issued an Interagency Agreement (IAG) with the U.S. Fish and Wildlife Service (U.S. FWS) to provide technical support for the RI/FS operable unit two.

White Bridge Road Site

The land at the White Bridge Road Site was used as a farm from 1945 until 1969. From 1970 until 1975, landfilling operations by the National Gypsum Corporation were performed. The refuse included asbestos tiles and siding. Following termination of the landfilling, the owner converted the property into a horse farm with stables, a riding ring, and pasture fields.

The Removal Action Branch (RAB) and EPA Emergency Response Team (ERT), together with a representative of the U.S. Fish and Wildlife Service (FWS), conducted site visits in March and June 1990 to assess the site and determine where appropriate samples could be taken. Based on ERT recommendations, the RAB collected soil and dust samples from the site on August 2, 1990. The soil samples were collected from various points at the surface of the dirt roadway, the riding track, and the edge of the grazing field. Samples were analyzed for percent asbestos content and type of asbestos fiber using the transmission electron microscopy method (TEM). On August 24, 1990, ERT collected a dust sample from within the house on the site and analyzed it by both polarized light microscopy (PLM) and TEM.

Samples collected by the RAB on August 2, 1990 confirmed visual observations that friable asbestos is present throughout the driveway of the White Bridge Road Site. Samples from the unpaved roadway indicate 2 percent chrysotile content. Samples from the riding track and adjoining areas indicate 5 percent chrysotile content. A sample collected by ERT on August 24, 1990 revealed fibrous asbestos (< 1 percent chrysotile) in the dust from within the house on the site.

New Vernon Road Site

The land at the New Vernon Road Site was used as a corn and dairy cattle farm from 1945 until 1980. However, in the late 1960s, for a period of approximately two years, refuse from National Gypsum was landfilled in two areas at this location. The refuse included loose asbestos fibers, broken asbestos tiles and siding. A small depression in the westernmost corner was filled first. Then a larger depression in the middle of the property was filled. The property was purchased by the current residents in 1980 and was graded and seeded. Currently there are five people residing at the site; a husband and wife, their two children, and a tenant.

Representatives from the RAB, ERT, and FWS conducted site visits in March and June 1990 to complete the removal assessment for the site. Based on ERT recommendations, the RAB collected soil and dust samples from the site on August 2, 1990. The soil samples were collected from various points at the surface of the driveway and the shed, and a dust sample was collected from the home owner's vacuum cleaner. Samples were analyzed for percent asbestos content and type of asbestos fiber using TEM. On August 24, 1990, ERT collected a dust sample from within the house on the site and analyzed it by both PLM and TEM.

Samples collected by the RAB confirmed visual observations that friable asbestos was present throughout the driveway of the New Vernon Road Site. Samples of the soil indicate 2 to 5 percent chrysotile content. The sample collected from the vacuum cleaner revealed 2 percent chrysotile content in the dust. A sample collected from the shed revealed 5 percent chrysotile content in the soil.

Air samples collected during drilling activities for the RI revealed low levels of asbestos (0.032 fibers/cc), site winds were limited (less than 5 mph) during much of the sampling. The standard for asbestos in air, based on an 8-hour time weighted average (TWA), is 0.1 fiber/cc. Some samples were also taken after a period of rain, which probably influenced the amount of airborne fibers present.

1.1.3 General Geologic Setting

A discussion of the geology of the site area is provided in the "*Draft Remedial Investigation Report, Asbestos Disposal Sites*" prepared for the National Gypsum Corporation by Fred C. Hart Associates on May 29, 1987. The following summary of the geologic setting is based on Hart's discussion (Section 4).

Pleistocene deposits overlie the Newark Basin in the study area. These deposits consist of glacial drift and glacio-lacustrine sediments deposited during Wisconsinan glaciation. The glacial drift deposits consist of poorly sorted moraine and well-sorted glacial-fluvial outwash deposits. The glacio-lacustrine deposits are primarily low permeability silts and clays deposited in a pre-existing ancient glacial lake.

White Bridge Road Site: The surface layer at this site contains 5 to 10 feet of asbestos fill material in the landfill area. This is underlain by a peat layer, ranging up to 3 feet thick.

New Vernon Road Site: There are five geologic layers at this site. The upper foot consists of topsoil fill which overlies up to 5 feet of asbestos fill in the landfill area. Under the asbestos is up to 10 feet of a sandy clay unit, underlain by 2 to 5 feet of sand.

2.0 SITE CHARACTERIZATION ACTIVITIES

This Work Assignment requires the performance of several different types of field activities to assist in characterization of the sites. Tasks to be performed in the field include:

surveying the site to develop a grid pattern for sampling purposes and topographic maps; a geophysical investigation utilizing ground penetrating radar in selected locations; soil sampling using hand augers and in some instances a drill rig; and analysis of the soil samples at a qualified laboratory. A second phase of sampling, focusing on water and sediment, is scheduled for a later date. This FOP addresses soil only.

The following subsections provide brief descriptions of the site characterization activities. More specific detail on these tasks is provided in the remaining sections of the FOP.

2.1 Site Survey and Grid Patterns

Alliance will arrange for surveying activities to be completed by a qualified and licensed surveyor. This task requires the establishment of site benchmarks for future reference, elevations specific to site features, the generation of a topographic map and a site grid. The survey responsibilities, records, and procedures shall follow the specifications presented in *Compendium of Superfund Field Operations Methods*, U.S. EPA, September 1987.

The map will achieve a 1 inch = 50 feet scale, and 2-foot contour intervals.

For horizontal accuracy, 90 percent of all defined points will be within 1/4 inch of their true position, and 100 percent of all defined points will be within 1/2 inch of their true position. For vertical accuracy, 90 percent of all contours shall be within one-half of a contour interval, and 100 percent of all contours shall be within one contour interval. Ninety percent of all spot elevations shall be accurate to within one-fourth of the contour interval, and all spot elevations shall be within one-half of the contour interval.

Mapping will show all planimetric features including, but not limited to, buildings, walks, roads, fences, ditches, trees, utility poles, pits, ponds, and other such features, as well as contours and spot elevations on roads, dikes, and ditch inverts.

All horizontal and vertical control points will be shown on the final map along with tabulation of coordinates and elevations. The description, origin, and elevations of the bench marks used for the mapping control will be shown on the map.

The horizontal coordinate system will be referenced to a local recoverable baseline at the site. The state plane coordinate system will be used when it is readily available near the site.

The map will show the basis of bearing, north arrow, names of streets and highways, project number, project name, and a bar scale. The 22 x 34 inch maps will be reviewed by Alliance and EPA before final submittal.

A grid pattern will be developed to assist in the identification of sampling locations. The White Bridge Road site will feature a 50 x 50 foot grid pattern across the entire site. The New Vernon Road will feature a 100 x 100 foot grid pattern across the site with a 50 x 50 foot pattern in the immediate vicinity of the dwellings on the site.

2.2 Geophysical Investigations

Geophysical methods can be useful for performing subsurface investigations at waste sites. In particular, ground penetrating radar (GPR) can be applied to characterize the nature of subsurface stratigraphy. A GPR survey is planned early in this investigation to assist in identifying the thickness of the uppermost asbestos fill layer. GPR does not specifically enable primary detection of asbestos materials. However, interpretation of the GPR data should help distinguish filled material vs. naturally deposited sediments.

Areas to be Surveyed

The GPR Survey will be collected over two 2.5 acre parcels; one at the White Bridge Road site; and one at the Mt. Vernon Road site. The riding track at the White Bridge Road site will be surveyed along a series of north-south parallel traverses spaced every 10 feet.

Perpendicular cross-lines will be also be collected at 100-foot spacing to the parallel lines together.

There are two areas at the Mt. Vernon Road site which will be surveyed by GPR. The filled pond area, and the area west of the garage, across the dirt road from the filled pond, will be investigated. The orientation of survey lines at the site will be similar to that of the White Bridge Road site, i.e., parallel traverses oriented north-south, and spaced 10 feet apart, and cross-lines shot every 100 feet.

Field Procedure

On the first day of the survey, test lines will be collected at each site for calibration purposes, and to assess whether the method is providing useful data. Antenna selection will also be made at each site. If it is determined that the data do not indicate the thickness of the filled material, the survey will be discontinued. Otherwise, the survey will proceed at each of the three areas until completion.

At the end of each field day, the data recorded in the field will be processed using Radan software, which is an industry standard signal enhancement processing package. Depending on the quality of the field data, and comparison with the computer enhanced records, a decision to process all, some, or none of the field data will be made. It is expected that at least 10 percent of the field records will be computer processed to help calibrate the field records. It may be necessary to process all of the records.

The GPR survey equipment will consist of a GSSI-SIR-3 system. The radar antenna used will be selected from amongst the following frequencies: 120 Mhz, 300 Mhz, 500 Mhz, and 1,000 Mhz. the GPR unit will be towed by hand. Field calibration will be performed by surveying over known buried objects such at sewer or utility lines.

Data from the GPR survey will be reduced and provided in a format which identifies the horizontal and vertical scales together with an interpretation of the data. A map showing the locations of the traverses as well as an interpretation of the thickness of the fill layer will also be provided. The GPR data will be reviewed in a timely manner so as to help direct boring activities.

2.3 Field Sampling

Samples will be collected for the surface and subsurface soils. In addition, air samples will be collected for health and safety purposes.

Alliance will use a combination of hand augering and drill rig services to collect soil samples at predetermined locations. Surface and subsurface samples will be collected at the following intervals: 0-6 inches, 6-18 inches and 18-36 inches. All analyses will be for asbestos content. Specific analytical techniques will vary depending on sample location. The air sampling component will involve personal monitoring and ambient air monitoring. All analyses of the air samples will be by phase contrast microscopy (PCM). More detail is provided in Section 3.0 of the FOP and in the QAPjP.

EPA has informed Alliance that additional testing of ground water, surface water and sediment may be required at these sites. The FOP will be revised to address any subsequent work when a statement of work is received. Additional QA components would be developed to address sampling the various media.

3.0 SAMPLING PROCEDURES

This section of the FOP outlines the sampling methods Alliance will utilize to obtain representative environmental samples. This section also discusses sample containers, sample handling/shipping, selected analyses, and quality assurance/quality control (QA/QC) as these

elements relate to the field program. This section is intended to supplement information provided in the QA Plan.

The primary objective of all sampling programs is to enable the acquisition of samples which are representative of the source under investigation. Samples must be suitable for subsequent analysis to enable accurate identification of the asbestos types and percent levels of asbestos present in the soil. Specific sampling methods and equipment associated with the White Bridge Road and New Vernon Road sites evaluation are outlined below. All sampling equipment re-used in the field for multiple sampling events will be decontaminated prior to use per the procedures outlined in Section 5.0 of the FOP, and in the QAPjP.

3.1 Soil Sampling

Surface and subsurface soil samples will be collected at the intersecting grid nodes within the site. Surface sampling will entail collecting a trowel or core sample to a depth of 6 inches at each node. Subsurface samples will be collected at depths of 6-18 inches and 18-36 inches, using split-spoon or thin wall tube samplers. Samples from each depth will be laid out separately on plastic sheeting or in a mixing bowl. Each layer will be carefully subsampled.

Each collected soil sample will be visually examined for evidence of suspected asbestos material. If the sample appears to contain asbestos, the sample will be submitted for PLM analysis. If no asbestos-contamination is suspected, the sample will be submitted for TEM analysis. Specific information on the soil sampling procedures is provided in the QAPjP.

3.2 Asbestos Bulk Sampling

If bulk sampling of suspected asbestos-containing material within any buildings is necessary, the Alliance inspector will collect representative samples from each suspected area in accordance with regulatory guidelines established in 40 CFR Part 763.86 (Asbestos Sampling). Alliance personnel will utilize the following procedures to collect bulk samples:

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- using a hand water sprayer, completely wet the area to be sampled to the degree that water fully penetrates the mass of the material (unless material is non-friable or cement-like);
- using a clean knife, cut loose a 5-10 cm^3 piece of the insulation material (approximately the size of a 25 cent quarter);
- place the material into a resealable plastic bag (Zip-Loc or Whirl-Pak), seal and label the bag;
- fill out the proper chain-of-custody forms and send the sample to the laboratory for analysis.

Samples will be analyzed by polarized light microscopy (PLM) using the "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M-4-82-020, December 1982.

3.3 Air Monitoring

Air monitoring will be conducted during field activities at both sites to determine airborne asbestos concentrations. Alliance will utilize a two-faceted monitoring approach. All air sampling will be conducted in accordance with 40 CFR Part 763 and NIOSH 7400 procedures. The approach is further described in the QAPjP.

4.0 ANALYTICAL PROCEDURES

In the performance of this Work Assignment, several hundred soil samples will be taken at the New Vernon Road and White Bridge Road sites, collectively. These samples will consist of a variety of materials including friable and non-friable asbestos-containing material (ACM), organic matter, topsoil, sand, and other inorganic matter. Additionally, there will be air samples taken to determine ambient fiber concentrations during soil boring and sampling activities.

To adequately characterize the extent of site contamination and to define clean areas for future use, there are four analytical approaches proposed. These are: visual screening,

polarized light microscopy (PLM), transmission electron microscopy (TEM), and phase contrast microscopy (PCM). More detail on these procedures is presented in the QAPjP.

4.1 Visual Screening

It is proposed that each soil sample will be examined for visual evidence of asbestos. It should be noted that visual screening is not a quantitative method, nor is it a positive method of identification. Field personnel will inspect each sample for the presence of asbestos tile chips, fiber bundles, or other indication of the presence of asbestos. If ACM is noted, the sample will be submitted for analysis by PLM. If no ACM is noted, the sample will be submitted for TEM analysis to verify that it is "clean".

4.2 Polarized Light Microscopy

PLM will be used to determine the type and quantity of asbestos fibers present in soil samples deemed to contain ACM by visual screening. PLM is the EPA recommended method for determining the presence of asbestos in bulk samples. Typically, the matrices are building materials which include, insulating materials, acoustical surfaces, sprayed-on fireproofing, floor and ceiling tile, and plaster. Analyses of the soil samples will be conducted in accordance with the EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M-4-82-020, December 1982. Analyses will be conducted by an accredited laboratory which satisfies the requirements of the National Institute of Standards and Technology (NIST).

4.3 Transmission Electron Microscopy

TEM will be used to determine asbestos content in soil samples that do not visually show evidence of contamination. Although there is presently no EPA reference method for TEM analysis in bulk solids, there are several interim methodologies in use. It is anticipated that the "wet transfer" method will be utilized in the analysis of these samples. TEM is more sensitive than PLM and will be used to verify the presence or absence of asbestos in the soil

samples that are suspected to be fill material. TEM can also verify fiber length and fiber diameter.

4.4 Phase Contrast Microscopy

PCM will be used to analyze ambient air samples collected as part of the health and safety effort. Sampling and analysis will be conducted in accordance with NIOSH 7400 procedures. Analyses will be conducted by an accredited laboratory satisfying NIST requirements. Each cassette filter will be prepared in accordance with the method and analyzed by fiber counting (number of fibers per field) to yield a fiber concentration per volume of air sampled (fibers/cc).

5.0 SITE MANAGEMENT PLAN

This section of the FOP outlines the management program for the investigatory work at the New Vernon Road and White Bridge Road Site. Items addressed in this section include: program organization, site access/control, and decontamination and waste management procedures. For additional information regarding control of site operations, refer to the Site Safety Plan prepared for this Work Assignment.

5.1 Program Organization

Figure 3 illustrates Alliance's overall program organizational structure for the site assessments at the New Vernon and White Bridge Road Sites. The key personnel assigned to this project and their areas of responsibility are listed in Table 1.

5.2 Personnel Responsibilities

The specific roles of the project personnel are discussed below.

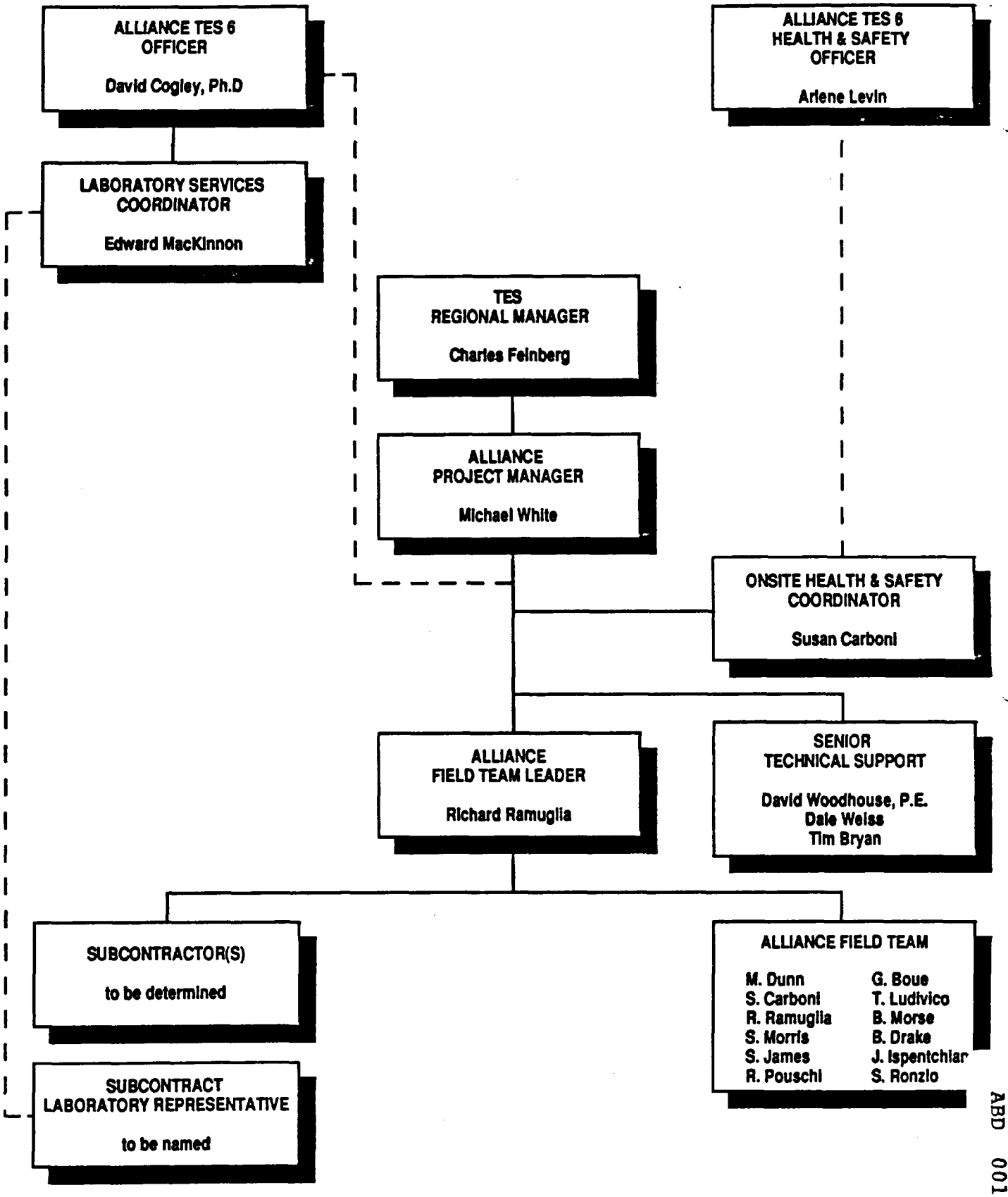

Figure 3. Program organizational structure.

TABLE 1. KEY PERSONNEL

Name	Professional Level	Responsibility
Russell Wilder	P-4	Program Manager
Chuck Feinberg	P-4	Regional Manager
Michael White	P-4	Project Manager
David Cogley	P-4	Quality Assurance Director
Nancy Lebedzinski	P-4	Program Safety Manager
David Woodhouse	P-4	Senior Technical Support
Edward MacKinnon	P-3	Laboratory Services Coordinator
Michael Clark	P-3	Senior Technical Support/Geologist
Dale Weiss	P-3	Senior Technical Support/Geologist
Tim Bryan	P-3	Senior Technical Support/Geologist
Richard Ramuglia	P-2	Field Team Leader/Geologist
Bruce Henning	P-2	Field Support
Susan Carboni	P-1	Onsite Health and Safety Coordinator
Maria Dunn	P-1	Field Sampler/Geologist
Scott James	P-1	Field Support
Robert Pouschi	P-4	Field Sampler/Chemical Engineer
Thomas Ludivico	P-1	Field Sampler
George Boue	P-3	Field Sampler/Inspector
Robert Morse	P-1	Field Sampler
Brian Drake	P-1	Field Sampler/Biologist
Julia Ispentchian	P-1	Field Sampler

Alliance Project Manager - Michael O. White

The Alliance Project Manager is responsible for the development of all work plans related to this work assignment, including the Field Operations Plan, Quality Assurance Project Plan (QAPjP), and the Site Safety Plan. The project manager will ensure that the above plans are developed in accordance with the required EPA and OSHA (29 CFR 1910.120) guidance.

The Alliance Project Manager (PM) is also responsible for developing the schedule for field work, assigning personnel to various tasks, and coordinating field work with all subcontractors. The project manager will appoint a Field Team Leader (FTL) and On-site Health and Safety Coordinator (OHSC), and delegate to these individuals the responsibility for maintaining compliance with the provisions established in the Sampling and Analysis Plan (SAP), Site Safety Plan (SSP), respectively.

Alliance Field Team Leader - Richard Ramuglia

The Alliance FTL will oversee all site activities and maintain compliance with the approved SAP and all applicable EPA regulations and/or guidance. The FTL will maintain daily logs of field activity, and oversee, or delegate oversight of the following activities: sampling/drilling, waste management, decontamination, sample handling/transport, and site access. The FTL will report directly to the Alliance PM.

The FTL will work with and oversee the OHSC, and act as OHSC in cases where the OHSC or designee is not present at the site.

Alliance Onsite Health and Safety Coordinator (OHSC) - Susan Carboni

The Alliance OHSC is responsible for implementing site operating standards and for coordinating all site safety activities. The OHSC will seek guidance from the Program Safety Manager (PSM) on all health and safety matters, and will report directly to the FTL when in

the field. The OHSC is responsible for conducting site-specific training and briefing sessions prior to the initiation of specific field tasks. All decontamination procedures for personnel and equipment shall be monitored by the OHSC. The OHSC shall also monitor the handling, storage, and daily inspections required by Alliance of any asbestos-containing wastes generated during field investigations.

5.3 Work Assignment Documentation

It is the intention of Alliance to provide complete and formal documentation of all activities which occur in the field, in accordance with the requirements outlined in EPA/540/P-89/100. A summary of the documentation activities to be implemented by Alliance during this program appears below.

5.3.1 Photo-documentation

The Alliance field team leader or designee will photodocument the initiation and execution of each field task outlined in the FOP. A brief description of the task and the date will be provided for each photograph.

5.3.2 Written Documentation

The Alliance field team leader will be responsible for maintaining the appropriate log books during the field program. Three types of written logs will be maintained including:

- **Project Log** - This log book will document each day's field activities, including sampling events, sampling locations, etc. and record field observations, weather conditions, accidents, and potential problem areas;
- **Equipment Log** - This log book will record all activities relating to the calibration and/or maintenance of field equipment; and

- **Field Change Log** - This logbook will record all changes to the field program which have been made by the Alliance field team leader on the basis of conditions encountered in the field.

5.4 Site Access/Site Control

Unrestricted access is anticipated throughout most of the New Vernon Road and White Bridge Road Sites, as obvious "hot spots" have been identified and represents a small percentage of the total acreage. However, in accordance with OSHA requirements for site access, three zones will be established at the site as discussed below.

- **Clean Zone**—This zone is presumably free of asbestos contamination and will contain the trailer and all support vehicles. This zone is to remain free of contamination, and therefore, the clean zone will be located upwind of the exclusion zone.
- **Contaminant Reduction Zone**—This zone will contain the decontamination station and waste dumpster. At each site, this zone will be established at the interface between the Clean Zone and the Exclusion Zone.
- **Exclusion Zone**—This zone includes all potentially-contaminated areas under investigation in this Work Assignment. These areas include: buildings, landfill areas, debris piles, and all surface and subsurface soils within designated areas.

Site access relative to the above zones is discussed below:

- Decontamination of personnel, equipment and samples will take place in the sample drop areas established in the *Contaminant Reduction Zone*. Sample containers will be further cleaned prior to entering the sample logging area within the Clean Zone.
- Unrestricted access is anticipated in all portions of the *Exclusion Zone* where Level C protective equipment is being utilized.
- Access to within a 50-foot radius of any drill rig within the *Exclusion Zone* will be controlled and limited to authorized oversight personnel.

5.5 Air Monitoring Program

A two-faceted air monitoring program has been designed to determine airborne concentrations of asbestos during field activities at both sites. The first facet entails area monitoring upwind and downwind of the subsurface boring and soil sampling activities. This will establish whether any fiber releases are occurring and whether control efforts should be increased or modified to maintain ambient concentrations of less than 0.01 fibers/cc. The second facet entails determining worker exposure levels. Although workers will utilize Level C protection, it will be necessary to monitor breathing zone fiber concentrations of the soil samplers to ensure breathing zone concentrations of less than 0.1 fibers/cc. Air monitoring will be in accordance with OSHA guidelines and NIOSH procedures. The air monitoring strategies, methods, and equipment are discussed in Alliance's Site Health and Safety Plan (October 1990).

5.6 Decontamination

The decontamination of personnel, portable equipment, drilling rigs, and subsurface boring tools and sampling equipment is crucial to maintaining site safety, preventing sample contamination, and preventing unwanted offsite transport of asbestos contamination. Most decontamination will take place in designated areas within the Contaminant Reduction Zone. Split-spoon samplers and other sampling equipment will be decontaminated after each sampling event at each sampling location, before proceeding to the next location. Sample containers will be wiped clean prior to entering the sample logging area within the Clean Zone. Personnel will go through specific decontamination procedures upon entering the Contamination Reduction Zone. Specifics on decontamination procedures are provided in the Health and Safety Plan.

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APPENDIX A
QUALITY ASSURANCE PROJECT PLAN

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FINAL
QUALITY ASSURANCE
PROJECT PLAN

FIELD SAMPLING AND ANALYSIS
AT THE ASBESTOS DUMP SITE
PASSAIC, NJ

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
26 Federal Plaza
Emergency and Remedial Response Division
New York, New York 10278

Work Assignment No.:	C02070
EPA Site/Facility I.D. No.:	NJD980654149
Contract No.:	68-W9-0003 (TES-6)
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Subcontract No.:	To be determined
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1.0 INTRODUCTION

This section addresses the specific quality assurance/quality control procedures to be followed under this Work Assignment (WA). Particular emphasis has been placed on the sampling and analysis component of the WA. This section has been prepared to meet the requirements of the document entitled *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, QAMS-005/80.

This Quality Assurance Project Plan (QAPjP) is a component of the Field Operations Plan (FOP) and, as such, contains information intended to supplement the FOP. The specific tasks outlined in the FOP have been developed from EPA guidance documents for Superfund investigations, a guidance document prepared by the State of New Hampshire, Department of Environmental Services entitled, "Guide to Asbestos Waste Site Remediation and Construction on Asbestos Waste Sites", November 1988, and verbal recommendations from various EPA personnel.

Alliance anticipates additional work to be performed at these sites to include ground water monitoring at existing wells, surface water and sediment sampling. These activities are not scheduled as part of the soil boring effort. Additional information on the water and sediment investigation will be provided at a later date (to be identified by EPA).

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2.0 PROJECT DESCRIPTION

This WA requires the performance of a comprehensive sampling and analysis effort at the New Vernon Road (NVR) and White Bridge Road (WBR) sites. The primary objective is the generation of valid representative data to evaluate the various remedial alternatives. Emphasis has been placed on defining the approximate perimeters of contaminated areas and further verification of areas reported to be uncontaminated. Specific goals for this assignment are defined as follows:

- Development and implementation of a field sampling program to assess the extent of asbestos contamination.
- Performance of the field program in accordance with an approved FOP. The FOP includes: the number and types of samples to be collected; analytical procedures; QA/QC procedures and objectives; and a Health and Safety Plan.
- The safe collection of representative samples of surface soils, subsurface soils, and other media deemed appropriate following a site walkover.
- Validation of all analytical data.
- Utilization of appropriately trained and certified personnel.
- Accurate and comprehensive reporting of all data in a format and schedule approved by EPA.

To accomplish the goals of this WA, Alliance has developed a field strategy that includes the following tasks:

- site walkover
- mobilization of field trailer
- site survey - grid and map
- geophysical investigation of selected areas - ground penetrating radar
- surface and subsurface soil sampling

- air monitoring (health and safety)
- laboratory analysis - PLM, TEM and PCM
- data reporting - weekly summaries and final reports

The remainder of this QAPjP focuses on the sampling, analysis and data reporting components of the WA. This strategy was developed considering requirements cited in the assigned Statement of Work and in several discussions with EPA personnel.

The schedule for this effort is summarized below:

Wed	10/24	Begin survey at WBR
Fri	10/26	End survey at WBR
Mon	10/29	Begin sampling at WBR
Wed	10/31	Begin survey at NVR ground penetrating radar at WBR
Fri	11/2	End all work at WBR Complete survey work at NVR
Mon	11/5	Begin sampling and ground penetrating radar at NVR
Fri	11/16	End sampling at NVR

This represents a tentative schedule, contingent on EPA approval of the Field Operations Plan.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Completion of this assignment will require a coordinated effort between Alliance and several subcontractors. Alliance will maintain close communication with the subcontractors to effectively communicate the technical requirements as stated in the FOP and any changes deemed necessary by EPA.

The section of the FOP entitled Site Management Plan provides information relevant to project organization. Presently, all of the subcontractors have not been selected and, therefore, those identified in the FOP represent a partial list. Keller and Kirpatrick of Parsippany, NJ have been selected to perform the survey and grid the site at the specified intervals. Hager-Richter Geoscience, Inc. of Salem, NH have been selected to complete the ground penetrating radar component of the project. Eastern Analytical Laboratories of Billerica, MA have been selected as the subcontractor laboratory. The driller will be identified during the week of October 29, 1990.

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4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall objective for this assignment is the collection of valid representative data. The quality control limits of accuracy and precision for laboratory analyses are governed by the methods and equipment used.

It must be recognized that QA objectives may be attainable only for samples that are homogeneous and "well-behaved". In the event that QA objectives cannot be met on specific samples, groups of samples or sample types, the laboratory will make every reasonable effort to determine the cause of non-attainment and, if such is due to instrument malfunction, operator error, or other identifiable cause within the control of the laboratory, the affected samples will be re-analyzed, if possible. Should non-attainment of QA objectives be due to sample heterogeneity, sample matrix interference, or other sample-related causes, reanalyses will be treated as additional analyses.

For many EPA-approved methods, interlaboratory method verification studies have been used to establish QC criteria which may be regarded as an inherent part of the method. In those cases, such criteria will take precedence except for deviations from such criteria that can be reasonably attributed to sample-related causes.

The quality assurance objectives for all measurement data include considerations of precision, accuracy, completeness, representativeness, and comparability as described below. More complete estimates of the QA objectives will be provided when the subcontract laboratory has been selected.

4.1 Precision and Accuracy

The precision of a measurement is an expression of mutual agreement of multiple measurement values of the same property conducted under prescribed similar conditions. Precision reflects the repeatability of the measurement. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same sample under the same conditions. Precision is usually expressed in terms of the standard deviation.

To assess precision, duplicate samples will be analyzed. A minimum of 1 in 10 samples or one per day (whichever is more frequent) will be analysed. Accuracy will be assessed through the analysis of known samples. The precision goal will be 25 RPD for all analyses. Accuracy may be assessed through a performance audit as described in Section 11.2.

The degree of accuracy of a measurement is based on a comparison of the measured value with an accepted reference or true value, or a measure of system bias. Accuracy of an analytical procedure is best determined based on analysis of a known or "spiked" sample quantity. The degree of accuracy and the recovery of analyte to be expected for the analysis of QA samples and spiked samples are dependent upon the matrix, method of analysis, and compound or element being determined. The concentration of the analyte relative to the detection limit is also a major factor in determining the accuracy of the measurement. Adequate data for measuring precision and accuracy of the TEM and PLM analytical methods for samples with soil matrices are not currently available.

4.2 Completeness

Completeness is a measure of the amount of valid data obtained from the measurement system relative to the amount anticipated under ideal conditions. This project QC objective for completeness, as determined by the percentage of valid data generated, will be $\geq$90 percent.

4.3 Representativeness

The QA objective is that all samples taken are representative of the media being evaluated. Sample selection and handling procedures will incorporate consideration of obtaining the most representative sample possible. Sampling devices will be cleaned between sampling points to ensure contamination does not enter the sample.

Representativeness will also be monitored by collection and analysis of replicate/split samples. Representativeness of specific samples will be achieved by the following:

- Collect samples from specified locations.
- Use of appropriate sampling procedures and equipment.
- Use of appropriate analytical methodologies.

Field replicate and field blank samples will be shipped as blind samples to the laboratory. These samples will be numbered similarly to other samples.

4.4 Comparability

Consistency in sample acquisition, handling, analysis and level of QA/QC is necessary so that the results may be compared to other similar data. Where appropriate, the results of the analyses will be compared with the results obtained in previous studies. The laboratory will use approved methods and reporting units, in order to assure that the data will be comparable to other similarly generated data sets.

5.0 SAMPLING PROCEDURES

Standard procedures will be followed during the field sampling effort to assure the collection of unbiased, representative samples. The remainder of this section describes the specific sampling procedures for soils and ambient air (health and safety).

5.1 Selection of Sampling Locations

Alliance has designed a field sampling program that features a concentrated grid pattern and collection of samples utilizing the grid for identifying sample locations. The strategy is intended to be rigorous in terms of identifying locations and gathering representative samples, yet flexible. Alliance has configured a program that requires collection of more samples than will likely be analyzed. Presently, the sample effort calls for sampling in the vicinity of each node of the grid. There are however, several exceptions to this strategy, each intended to address specific concerns of EPA. If, during the field effort, one of the field personnel notes additional areas of concern that exist away from a predetermined sampling point, they will confer with the Field Team Leader to discuss the collection of additional samples. EPA has agreed that collection of samples in known contaminated areas will not be required at each grid point. Emphasis has been placed on what is thought to be "clean area".

The relocation of the riding track at the White Bridge Road site has been identified by EPA as the first priority at these sites. As a general rule, Alliance will focus on sampling from clean areas first to minimize cross contamination. We will also be coordinating with EPA-Removal Action Branch personnel who are also working at these sites.

5.1.1 White Bridge Road

The White Bridge Road site will be sampled at each node of a 50 x 50 foot grid pattern. Samples will be collected within a 3-foot radius of the node marker. This will yield approximately 237 surface points. A 100 x 100 foot grid pattern would yield approximately 70 surface points. Presently, our Work Plan cites the 50-foot grid pattern yielding 237 points.

5.1.2 New Vernon Road

The New Vernon Road site will be set up with two different grid patterns. The area near the dwellings, from New Vernon Road to the drainage ditch behind the houses (north to south), and the two recently paved roads (west to east), will be staked in a 50 x 50 foot grid pattern. This represents the area near the dwellings in the vicinity of the filled pond. This will yield approximately 45 surface points on the 50-foot grid pattern. The remainder of the property will be staked in a 100 x 100 foot grid pattern. This will yield approximately 165 surface points on the 100-foot grid pattern. The total number of surface points at the New Vernon Road site will be approximately 210 (45 from 50-foot grid, 165 from 100-foot grid).

5.1.3 Background Sample Collection

Offsite samples will be collected to determine the background asbestos content in naturally occurring soils in the area.

Alliance will select locations for these background samples corresponding with the types of naturally occurring soils likely to be found buried under the asbestos fill at the sites. It is anticipated that six locations will be chosen by Alliance geologists: two samples will be taken on the northwest side of each site with one sample taken in wetland soil and one in

upland soil. Two samples will also be taken at least one mile away from these sites in similar soils; one in wetlands and one in upland soil of the same soil series.

5.1.4 Ambient Air Monitoring Locations

During each sampling day, two ambient air samples (one upwind, one downwind) will be collected in the vicinity of the site boundary. In addition to these stationary samples, three members of the 8-person field team will wear personal sampling pumps to monitor exposure during typical work days. These devices will be used to collect data for health and safety purposes.

5.2 Sample Collection and Handling

For this effort, Alliance will collect surface and subsurface soil samples. The overall objective is to collect representative samples at three different depth intervals at each predetermined surface sample point (0-6 inches, 6-18 inches, and 18-36 inches).

It is anticipated that the soil sampling component will require a soil boring approach that may vary from point to point. Given the size of the sampling areas, Alliance is likely to encounter several different scenarios when performing the soil borings. In consideration of this, we are presenting several different procedures for soil borings and collection of representative samples. The specific procedure to be utilized will be based on conditions at each sampling location.

These procedures are based on guidance cited in the EPA publication entitled "Characterization of Hazardous Waste Sites - A Methods Manual, Volume II, Available Sampling Methods, Second Edition (EPA-600/4-84-076).

Prior to the collection of any samples the field personnel will accurately assess this location (distance, direction) relative to the nearest grid point. A narrative log will be prepared during each boring to assess geologic characteristics.

5.2.1 Soil Sampling With Thin Wall Tube Samplers

Use of a thin wall tube sampler will be the primary method for obtaining shallow soil samples. The system consists of an auger bit, a series of drill rods, a "T" handle, and a thin-wall tube corer. The auger bit is used to bore a hole to the desired sampling depth and then withdrawn. The auger tip is then replaced with the tube corer, lowered down the borehole, and forced into the soil at the completion depth. The corer is then withdrawn and the sample is collected.

Alternately, the sample can be recovered directly from the auger. This technique, however, does not provide an "undisturbed" sample as would be collected with a thin tube sampler. In situations where the soil is rocky, or there are other obstructions, it may not be possible to force a thin tube sampler through the soil or sample recovery may be poor. In these cases, a soil sampling shovel will be used to obtain samples.

The tube sampling system can be used in a wide variety of soil conditions. It can be used to sample both from the surface, by simply driving the corer without preliminary borings, or to depths in excess of 6 meters. The presence of rock layers and the collapse of the borehole, however, usually prohibit sampling at depths in excess of 2 meters. Interchangeable cutting tips on the corer reduce the disturbance to the soil during sampling and aid in maintaining the core in the device during removal from the borehole.

Procedures for Use

1. Clear an area approximately 15 cm in radius around the sample location.
2. Attach the thin-walled tube sampler to the "T" handle.
3. Install proper cutting tip.
4. Gradually force the corer into the soil. Hammering the corer should be avoided as vibrations may cause the boring walls to collapse.
5. Remove corer and unscrew drill rods.
6. Remove cutting tip and remove core from the device.
7. Carefully empty corer contents on a clean plastic sheet.
8. Record the appropriate characterization of the soil in the field logbook.
9. Divide coring into appropriate intervals: 0-6" 6-18", 18-36" and collect sample. (The thin-wall sampler is approximately 1-inch in diameter and, therefore, the entire contents will be used for samples, so that no waste is generated.)

5.2.2 Soil Sampling with a Shovel and Scoop

The simplest, most direct method of collecting soil samples is with the use of a shovel and scoop. Very accurate representative samples can be collected using this procedure depending on the care and precision demonstrated by the field sampling personnel.

The shovel used for this procedure features a long narrow spade (approximately 12 inches). Careful collection with this device can yield an undisturbed profile depending on the soil characteristics (most notably moisture content).

A pointed mason's trowel can be used to cut a block of the soil at the desired intervals; or, a scoop can be used to collect samples from the subsurface wall.

Using this procedure basically involves digging a rectangular hole approximately 8 inches wide (width of the shovel), 24 inches long and completed to the desired depth. The boring features a gradual incline from the bottom of the boring to the surface. A schematic of this would resemble a 90 degree triangle. Grab samples would be collected from the vertical side using a stainless steel scoop.

Procedures for Use

1. Clear an area approximately 15 cm in radius around the sample location.
2. Insert the shovel perpendicular to the surface of the soil.
3. Place the soil cuttings on plastic sheeting taking care not to mix piles generated. Assess the characteristics of each pile generated.
4. Continue the digging until you have reached the desired depth.
5. Using a clean wooden tab and ruler, mark the intervals of interest.
6. Using a clean stainless steel spatula, collect a representative sample from the wall of the boring taking care to stay within the marked interval. The spatula should be wiped clean between each sample interval to avoid cross-contamination.
7. Replace the soil to the boring in the reverse sequence from that removed.
8. Fill the boring to the surface using clean soil obtained from an offsite location.

5.2.3 Split Spoon Sampling

In instances where a deeper sample is required, a drill rig will be accessed. A minimum of three borings will be completed in the area of the riding track at White Bridge Road. If the GPR data proves to be inconclusive, a total of six borings will be completed. A minimum of two borings will be completed in the area of the filled pond at New Vernon Road. A minimum of three borings will be completed in the landfill area of NVR. All borings will be completed until native soil is encountered.

The drill rig will also be used in locations where hand augering is not practical. For these purposes, the surface soil sample (0-6 inches) may be collected by hand and the remainder from a 2- or 3-inch split spoon sampler driven to the desired depth. After the sampler has been removed from the ground, it will be laid on a clean sheet of plastic. The sampler will then be opened, inspected and the appropriate geologic assessment made. An aliquot from the split-spoon sample will be removed and transferred to a sample bag.

5.2.4 Ambient Air Sampling

Air monitoring will be conducted during field activities at both sites to determine airborne asbestos concentrations. Alliance will utilize a two-faceted monitoring approach. All air sampling will be conducted in accordance with 40 CFR Part 763 and NIOSH 7400 procedures.

5.2.4.1 Area Monitoring

The first facet will establish the transport of asbestos fibers from disturbed areas (i.e., boreholes) through the use of upwind and downwind-sited monitoring stations. Alliance will set up one upwind station and one downwind station. Meteorological conditions and field

activities will dictate the actual siting of these stations. Meteorological conditions will be assessed by the OSC daily.

Each station will be equipped with a calibrated air pump with tripod, tubing, and 25mm three-piece filter cassette. The filter material will be mixed cellulose ester. The cassettes will be equipped with a 50mm conductive cowl. Power supply for the pumps will depend upon the siting. If possible, extension cords will be run from an outbuilding to the stations. Alternatively, 110 VAC generators can be used to provide the needed power.

Area sampling will be conducted at a rate of 4-5 liters per minute for an 8-hour period each day. Sampling will be conducted with the cassettes positioned at a 45 degree downward angle. If field activities (i.e., boring or soil sampling) are interrupted or stopped on a given day, the area sampling will also be stopped. In short, this approach is intended to indicate whether fiber releases are occurring during ongoing field activities, and whether modification of dust control procedures is needed (i.e., additional wetting, etc.) to prevent airborne transport of asbestos fibers offsite.

5.2.4.2 Personnel Monitoring

The second facet to the air monitoring program is the determination of worker exposure concentrations of fibers. This is an important part of the health and safety aspects of the field program and will serve to not only assess worker exposure, but will also indicate whether adequate wetting and dust control procedures are being implemented at each boring/soil sampling location.

Alliance will outfit one person in each two-man crew with a personal air sampling pump (i.e., DuPont Alpha-1 or equivalent), and a filter cassette. The filter type is a 25mm mixed cellulose ester filter enclosed in a three-piece cassette equipped with a 50mm conductive

cowl. The pumps are equipped with rechargeable batteries and need no external power supply.

Personal sampling will be conducted at the rate of 2 liters per minute for a 4-hour period. There will be two sampling periods per day for each monitored person. Sampling will only be conducted while the person is inside the Exclusion Zone. The pumps will be stopped, and the cassettes recovered upon exit from the Exclusion Zone.

The cassettes will be positioned at a 45° downward angle within 12 inches of the person's breathing zone. The cassette is typically affixed to a collar or shirt-front.

5.3 Sample Containers

Sample containers will be obtained prior to sampling. It is anticipated that in most cases, resealable clear polyethylene bags of the Zip-Loc or Whirl-Pak variety will be utilized for the collection of soil/bulk samples. When warranted, 4-oz. wide mouth glass jars or styrene blood vials will be used, especially when the sample contains a sharp object (i.e, tile fragment) which may pierce the plastic bag.

5.4 Decontamination of Sampling Equipment

In order to maintain sample integrity, the sample collection devices will be decontaminated between each sample location. The decontamination procedure can be summarized as follows:

1. Using a moist paper towel, wipe excessive soil from the sampling device.
2. Spray the device with a hand sprayer of soap solution. Wipe dry.

3. Spray with DI water. Wipe dry.

4. If visual inspection indicates the device is not suitably cleaned, return it to the trailer for more thorough soap and water treatment.

Alliance expects the decontamination area at each site to be located at the interface of the Clean and Exclusion Zones. This area will be referred to as the Contaminant Reduction Zone. The precise locations and boundaries of these zones will be identified by the PM, FTL, and OHSC prior to initiating any field activities at either of the sites.

Any heavy equipment (drilling rigs) utilized at each site will be decontaminated in one decontamination area. The drill rig(s) will be steam-cleaned prior to vacating the site within the Contamination Reduction Zone.

Sampling equipment such as hand augers, split-spoons, pans, spatulas, and other implements that come into contact with samples, will be decontaminated using a wipe and rinse procedure. Initially, the equipment is thoroughly washed and scrubbed in the laboratory during the mobilization effort. Alconox and tap water will be used in the initial cleaning, followed by a thorough tap water and DI water rinse. The equipment is then air or oven-dried, and then wrapped in aluminum foil or clean polyethylene sheeting for transport. Onsite decontamination (immediately following use in sample collection) will be conducted at the sampling location by first wiping down with a wet-wipe, and then spray-rinsing using a hand-held sprayer and tap water.

5.5 Determination of Appropriate Analytical Technique

Throughout the sampling effort, field decisions will be made to determine appropriate analytical procedures for determination of asbestos content in the soil. The following is a

summary of evaluation criteria to assist in the determination of the appropriate analytical technique (PLM or TEM).

PLM will be used in the following situations:

- If visual observations indicate the presence of suspected asbestos material.
- If the soil sample is collected from an area of known contamination.

TEM will be used in the following situations:

- If, when collecting samples in an area originally thought to be clean, material encountered by the geologist is determined to be fill (not native soil).
- If a sample was thought (based on visual observations) to contain asbestos, but tested negative by PLM, it will be reanalyzed by TEM to confirm negative results.
- All surface samples (0-6 inches) that do not show visible evidence of asbestos.

PCM will be used for ambient air samples collected as part of the Health and Safety component.

Upon collection, all surface soils will be submitted for analysis using the previously discussed evaluation criteria for determination of the analytical technique. If, after analysis, the sample tests positive at the surface, the first subsurface soil sample (6-18 inches) will be analyzed. The same evaluation criteria applies for determining technique. Alliance will notify EPA prior to authorization of analysis of the subsurface samples.

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6.0 SAMPLE CUSTODY

Sample custody and documentation procedures described in this section will be followed throughout all sample collection activities at the White Bridge Road and New Vernon Road sites. Components of sample custody procedures include the use of field logbooks, sample labels, and chain-of-custody forms.

6.1 Field Logbooks

The Alliance Project Manager will control all field logbooks. These are bound books, preferably with consecutively numbered pages that are at least 4-1/2 in. x 7 in. in size. Bound field logbooks will be maintained by the Alliance Field Team Leader and other team members to provide a daily record of significant events, observations and measurements during the field investigation. All entries will be signed and dated.

All information pertinent to the field survey and/or sampling, except drill logs, will be recorded in the logbooks. Entries in the logbook will include at least the following:

- name and title of author, date and time of entry, and physical/environmental conditions during field activity,
- purpose of sampling activity,
- location of sampling activity,
- name and address of field contact,
- name and title of field crew,
- name, title, and organization of site visitors,
- sample collection method,

- number of sample(s) taken,
- description of sampling point(s), depth,
- date and time of collection,
- sample identification number(s),
- sample distribution (e.g., laboratory),
- field observations,
- references for all maps and photographs of the sampling site(s), and
- all sample documentation such as:
  - dates and method of sample shipments, and
  - chain-of-custody records.

All original data recorded in Field Logbooks, Sample Tags, and Chain-of-Custody Records will be written with waterproof ink. None of these accountable documents will be destroyed or thrown away, even if they are illegible or contain inaccuracies that require a replacement document.

If an error is made on an accountable document assigned to one individual, that individual will make all corrections by crossing a line through the error and entering the correct information. The erroneous information will not be obliterated. Any subsequent error discovered on an accountable document will be corrected by the person who made the entry. All subsequent corrections will be initialed and dated.

Alliance will also maintain a daily spreadsheet to catalogue all samples collected. Included in this spreadsheet will be a list of sample ID, time, location and analytical procedure.

6.2 Sample Tags

Each sample removed from each site and transferred to a laboratory for analysis is identified by a sample tag which contains specific sample information.

The information recorded on the sample tag includes:

Coded Sample I.D. - The unique sample identification number used to document that sample.

Project Code - The number assigned to the sampling project.

Date - 00/00/00 indicating month, day and year.

Grid Node Location - The location or coordinates of the node where the sample was collected (included in sample ID).

Sample Depth - The depth at which the sample was taken (included in sample ID).

Sampling Method - Indicating auger, core, or surface sampling.

Samplers - Signature of sampler.

Remarks - Sample numbers, as well as any pertinent comments, are entered here.

Analytical methods

Sample information will be recorded on tags or labels affixed to each container. An example of a sample tag is provided in Figure 6-1.

Figure 6-1. Sample label and chain-of-custody seal.

ALLIANCE Technologies Corporation

Sample ID # :
Date : Sampling Method :
Collected By :
Analytical Method (PLM or TEM) :
Comments :
Project No. 1-635-195-02PA2-0

ALLIANCE Technologies Corporation Chain of Custody Sample Seal	FIELD SAMPLE NO.	DATE	SEALERS INITIAL
	RUN #	SAMPLE DESCRIPTION	
	SEALERS NAME (PRINT)	SEAL BROKEN BY & DATE	

ABD 001 1395

6.3 Custody Seals

When samples are shipped, they will be placed in containers sealed with custody seals. An example of a custody seal is shown in Figure 6-1.

6.4 Chain-of-Custody Records

To maintain a record of sample collection and transfer for all samples processed, a "chain-of-custody record" (Figure 6-2) will be filled out for each sample type by the team at each sampling location. The chain-of-custody record must be secured to the inside of the shipping cooler.

Each time the samples are transferred to another person, signatures of the person relinquishing the sample and receiving the sample, as well as the time and date, will be filled out in the appropriate spaces on the chain-of-custody record. This will complete the sample transfer process. It will be the laboratory's responsibility to maintain internal logbooks and records that provide a custody record throughout sample preparation and analysis. To provide a systematic approach to tracking field samples through collection and data handling, the oversight team will maintain copies of all chain-of-custody records.

Two copies of this record will follow the samples to the laboratory. The laboratory retains the completed original, and one file copy is sent to the Alliance Laboratory Coordinator. A copy of the completed original is returned as a part of the final analytical report. This record will be used to document sample custody transfer from the sampler, to another Alliance team member, to a shipper, or to the laboratory.

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CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME	NO. OF CONTAINERS	Volatile Organics	Extractible Organics	Pesticide/PCBs	Metals	Physical Parameters	PCDD/PCDF			REMARKS
SAMPLERS : *(Signature)*											
DATE SAMPLED	SAMPLE ID/DESCRIPTION										

Relinguished by: (Signature)	Date/Time	Received by: (Signature)	Laboratory:
Relinguished by: (Signature)	Date/Time	Received by: (Signature)	P.O. No.
Relinguished by: (Signature)	Date/Time	Received by: (Signature)	Report Data to:
Relinguished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Airbill No.

Distribution: Original Accompanies Shipment; Copy to Laboratory Coordinator

ABD 001 1397

Figure 6-2. Ch -of-custody record.

AF 047

Shipments will be sent by common carrier and a bill of lading will be used. Bills of lading will be retained as part of the permanent documentation.

6.5 Laboratory Handling

The contracted laboratory will document the receipt of samples and will handle according to the requirements within the Work Assignment.

6.6 Evidence File

The Alliance FTL will serve as file custodian. At the project's completion, the files will be returned to the U.S. EPA Work Assignment Manager, who will serve as file custodian.

The evidence file will contain all incoming materials related to the project such as: sketches, correspondence, authorizations, and logs. These documents will be placed in the project file as soon as is practical. If correspondence is needed for reference by project personnel, a copy will be made rather than retaining the original. All records shall be legible and easily identifiable.

Examples of the types of records that will be maintained in the project file are:

- Field documents;
- Correspondence;
- Photographs;
- Laboratory data;
- Reports; and
- Procurement agreements.

Outgoing project correspondence and reports will be reviewed by the Project Manager or designee prior to mailing.

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7.0 ANALYTICAL PROCEDURES

Alliance has selected a qualified subcontractor laboratory to meet the needs of this assignment. This section is presented as a brief summary of the analytical procedures.

Samples which, upon visual inspection, exhibit possible asbestos contamination will be analyzed by Polarized Light Microscopy (PLM) according to EPA interim method 600/M4-82-020, December 1982. Samples which do not exhibit possible asbestos contamination upon visual inspection will be analyzed for asbestos by Transmission Electron Microscopy (TEM). Air samples, which will be collected during soil boring and sampling activities, will be analyzed by Phase Contrast Microscopy (PCM) according to NIOSH Method 7400. The following are general method descriptions of the sample preparation procedures which will be performed and reference to the applicable analytical method.

7.1 Polarized Light Microscopy

The PLM procedure has a lower detection limit of 1% asbestos and an upper limit of 100%. The soil samples will be prepared and analyzed according to the following procedure:

> Using stereo-scopic microscopes, the sample is inspected for fibrous material. The fibrous material is separated from the soil and is gently teased apart. A uniform aliquot of the teased fibrous material is placed on a clean glass slide containing calibrated refractive index solution, a clean glass cover slip is then placed over the sample and solution. The slide is then analyzed by PLM according to the EPA "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M-4-82-020, December 1982.

The laboratory will analyze samples in duplicate at a frequency of 1 in every 10 samples or one per day whichever is more frequent. The duplicate is selected by an internal computer report generations program. The report lists original/duplicate analysts, their respective results, signatures of the analysts and is maintained in the project QA log.

7.2 Transmission Electron Microscopy

The TEM procedure lower detection limit will be 0.1 percent asbestos. The TEM procedure proposed includes the use of a special sample preparation technique. A aliquot of the sample is ashed, extracted with water, filtered, and the filter analyzed using TEM procedures originally developed for air samples (as cited in the Federal Register, Volume 52, Number 210). Presently, there is no EPA endorsed procedure for TEM analysis of bulk solids.

The detection limit is calculated using the following formula:

$$\frac{\text{Areas of Filter}}{\text{Area of gird}} \times \frac{\text{Volume dilute in}}{\text{Volume filter}} \times \frac{100\ \text{mL}}{\text{Volume extracted}} \times \frac{\text{calculated wt}}{\text{original wt of sample}} \times 100$$

Sample preparation is summarized below:

1. Weigh approximately 0.5 gm. of the sample, place in a crucible and ash at 480°C for 2-3 hours.

2. The ashed sample is diluted with 100 ml of filtered water in a volumetric flask and shaken vigorously. Let the sand and gravel components settle.

3. Extract 50 ml of the supernatant to 50 ml of filtered water and shake vigorously.

4. Filter 20 ml of the final solution through a 0.45 micron filter, and prep for TEM, as required in 52 CFR 210.

7.3 Phase Contrast Microscopy

Personal monitoring cassettes will be prepared and analyzed according to NIOSH Method 7400. The cassettes will indicate the presence of any airborne asbestos which could cause a health threat to the sampling personnel.

The sample preparation for PCM analysis is summarized below:

1. Place labeled microscope slides on a preheated low temperature drying plate.

2. Open the cassette and with a razor blade remove 1/3 to 1/2 of the membrane.

3. Place a drop of the acetic acid - dimethyleformamide clearing solution on the slide, and quickly place the piece of filter on the drop of liquid with the loaded face of the filter up.

4. Blot away excess liquid and allow the slide to rest undisturbed until completely cleared (15-30 minutes). The slid is now ready for analysis.

5. Analysis is in accordance to the "A" counting rules of NIOSH Method 7400.

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8.0 CALIBRATION PROCEDURE AND FREQUENCY

Equipment requiring calibration during the sampling and analysis effort include: air sampling pumps, laboratory microscopes, and the refractive index solutions. The following subsections summarize the calibration procedures to be analyzed during this project.

8.1 Field Equipment

Field sampling equipment requiring calibration is limited to the constant flow pumps used for air sampling. All pumps will have initial and final calibration checks. Calibration is accomplished by connecting the pump to a bubble tube to determine the distance the bubble travels within a measured period of time. An alternative method of calibration would be the use of a Buck Calibrator. The Buck Calibrator is a primary standard that electronically measures flowrates.

A minimum of three readings will be performed before and after each sample event for each pump used.

8.2 Laboratory Equipment

There are several different calibrations or periodic checks that are completed as part of routine operations at the laboratory performing the microscopic analysis. A copy of the laboratory Asbestos Analysis Manual has been provided to EPA for additional review of QC procedures. The following is a bullet listing of routine calibration checks performed at the laboratory:

- Daily inspection of the fume hood for adequate ventilation.
- Daily inspection of laboratory for possible sources of contamination.

PLM/PCM

- Daily inspection of microscope to assure occulars and objectives are clean. Check for koehlar illumination, check the reticle and gypsum plate.
- Prior to each use, check the centering objectives, substage condensor, and iris diaphragm.
- Weekly check the dispersion staining colors of Amosite in n=1.680 refractive index oil.
- Daily checks of a blank filter and re-count a standard slide.

TEM

- Daily check of microscope alignment and obtain centered Wehhelt image.
- Monthly (or after service) check instrument magnification against magnification standard of 1134 lines/mm.
- Weekly determine electron diffraction pattern of gold standard. Recalibrate if the pattern indicates change in camera constant.
- Daily check EDS calibration by Cu and Al lines, check both peaks.

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

The procedures used for calculations and data reduction are specified in each analytical method referenced in Section 7.0. Raw data are entered in bound laboratory notebooks. A separate book is maintained for each analytical procedure. The data are entered such that sufficient space remains to enter all subsequent calculations required to arrive at the final (reported) value for each sample.

9.1 Data Reduction

Data reduction of all analytical parameters will be conducted by the laboratory in strict accordance with the analytical protocols referenced in Section 7.0.

9.2 Data Validation

Data validation is the process of filtering data and accepting or rejecting it on the basis of sound criteria. Project supervisory and QC personnel will use validation methods and criteria appropriate to the type of data and the purpose of the measurement. Records of all data will be maintained, even that judged to be an "outlying" or spurious value. The persons validating the data will have sufficient knowledge of the technical work to identify questionable values.

9.2.1 Field Data Validation

Field sampling data will be validated by the Field Team Leader based on his judgment of the representativeness of the sample, maintenance and cleanliness of sampling equipment, and adherence to the approved, written sample collection procedure.

The following criteria will be used to evaluate the field sampling data:

- Use of approved sampling procedures, and
- Proper chain-of-custody maintained.

9.2.2 Analytical Data Validation

EPA Region II does not cite specific criteria for validation of microscopic analyses. Therefore, data validation will consist of internal quality control checks by the laboratory and general review of reported data by Alliance. A summary of the internal quality control checks are provided in Section 9.0 of this QAPjP.

9.3 Identification and Treatment of Outliers

Any data point which deviates markedly from others in its set of measurements will be investigated; however, the suspected outlier will be recorded and retained in the data set. One or both of the following tests will be used to identify outliers.

Dixon's test for extreme observations is an easily computed procedure for determining whether a single very large or very small value is consistent with the remaining data. The one-tailed t-test for difference may also be used in this case. It should be noted that these tests are designed for testing a single value. If more than one outlier is suspected in the same data set, other statistical sources will be consulted and the most appropriate test of hypothesis will be used and documented.

Since an outlier may result from unique circumstances at the time of sample analysis or data collection, those persons involved in the analysis and data reduction will be consulted. This may provide an experimental reason for the outlier. Further statistical analysis will be

performed with and without the outlier to determine its effect on the conclusions. In certain cases, two data sets may be reported, one including and one excluding the outlier.

In summary, every effort will be made to include the outlying values in the reported data. If the value is rejected, it will be identified as an outlier, reported with its data set and its omission noted.

9.4 Data Reporting

The QC officer of the contracted laboratory will submit all data packages to Alliance's Laboratory Services Coordinator for review and incorporation into the Final Report.

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10.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results on these samples. These checks will be performed by project participants through the program under the guidance of the Alliance QA Officer.

10.1 Data Collection and Sampling QC Procedures

The internal QC checks for the sampling aspects of this program will include, but not be limited to, the following:

1. Use of field notebooks to ensure completeness, traceability, and comparability of the samples collected.
2. Field checking of field notebooks and sample labels by a second person to ensure accuracy and completeness.
3. Strict adherence to the sample chain-of-custody procedures outlined in the QAPjP.
4. Collection and analysis of field blanks and field duplicates/splits.

10.2 Analytical QC Procedures

These procedures are summarized in the following subsections.

10.2.1 Duplicate and Blank Sample Analysis

Duplicate analyses are performed to evaluate the precision of an analysis. Results of the duplicate analyses are used to determine the relative percent differences between replicate samples. Field (blind) duplicate samples will be taken. Duplicate analysis results will be summarized on the quality control data summary form. A minimum of every 10th sample

will be used for duplicate analysis as part of routine laboratory quality control. For every 10th sample, the analyst will be required to prepare a blank using the same preparation tools, oils, slides and coverslips used to prepare samples. If asbestos is detected, the last 10 samples must be reanalyzed and corrective actions noted. The report will be filed in the project QA log.

10.2.2 Other Laboratory Quality Control Checks

Quality control checks will be performed to ensure the collection of representative samples and the generation of valid analytical results on these samples. These checks are performed by project participants under the guidance of QC personnel. The laboratory makes use of different types of QC samples to document the validity of the generated data.

Participation in NIST performance evaluation studies is mandatory for all project analysts. Results of individual analysts' are reported through blind, independent analysis supervised by the laboratory manager. Internal proficiency for each analyst is assessed by using:

1. a 10% replicate/duplicate analysis of all samples
2. individual results from NIST PE studies
3. individual results from inter-laboratory QA programs
4. blind PE samples from clients.

These results are combined to assess the operator's precision and accuracy and are reported on Monthly QA Log Summaries. A performance of 80 percent or better is required for each analyst.

11.0 PERFORMANCE AND SYSTEM AUDITS

Field quality assurance audits will be performed. The audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation. Drilling, equipment decontamination, and sampling activities will be observed. A laboratory system audit will also be conducted by Alliance.

11.1 System Audits

System audits will encompass evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field quality control procedures and associated documentation may be system audited.

11.2 Performance Audits

Performance audits may be conducted periodically throughout the life of the project to determine the accuracy and implementation of the measurement system(s) and parameter(s). Unplanned audits may be implemented once the measurement systems are operational and initially generating measurement data.

Alliance will work with EPA to assess the possibility of procuring asbestos-in-soil standards which would then be submitted to the subcontracted asbestos analysis laboratory as performance evaluation samples.

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12.0 PREVENTIVE MAINTENANCE

12.1 Preventive Maintenance Procedures

Field equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedure developed by the operators.

12.2 Schedules

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools, gauges, etc., shall be performed by qualified personnel.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based upon experience and previous use of the equipment.

12.3 Records

Logs are maintained to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools and gauges. Records produced shall be reviewed, maintained, and filed by the operators at the laboratories and by the data and sample control personnel when and if equipment, instruments, tools and gauges are used at the sites. The project QA officer may audit these records to verify complete adherence to these procedures.

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13.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

Procedures used to assess data precision and accuracy are in accordance with 44 FR 69533 "Guidelines Establishing Test Procedures for the Analyses of Pollutants", Appendix III Example Quality Assurance and Quality Control Procedures for Organic Priority Pollutants", December 3, 1979. Completeness is recorded by comparing the number of parameters initially analyzed with the number of parameters successfully completed and validated. For this project a target, control limit of greater than 90 percent will be used.

13.1 Accuracy

If asbestos-in-soil standard reference materials can be procured, Alliance will submit these samples a performance evaluation samples. In that case, accuracy would be defined as: the measured value divided by the known value x 100. If Alliance submits spiked asbestos-in-soil samples, accuracy will be reported as percent recovery.

The percent recovery is calculated as:

$$\% = \frac{S_s - S_o}{S} \times 100$$

where: S_o = The background value, i.e., the value obtained by analyzing the sample.

S = Concentration of the spike added to the sample.

S_s = Value obtained by analyzing the sample with the spike added.

% = Percent recovery.

13.2 Precision

The relative percent difference is calculated as:

$$\frac{V_1 - V_2}{(V_1 + V_2)} \times 2 \times 100 = \% \text{ difference}$$

where: V_1, V_2 = The two values obtained by analyzing the duplicate samples.

13.3 Completeness

Completeness will be reported as the percentage of all measurements made whose results are judged to be valid. The procedures to be used for validating data and determination of outliers are contained in Section 8.0 of this QAPjP Plan. The following formula will be used to estimate completeness:

$$C = 100 \quad \frac{V}{T}$$

where: C = Percent completeness.

V = Number of measurements judged valid.

T = Total number of measurements.

14.0 CORRECTIVE ACTION

The acceptance limits for the sampling and analyses to be conducted in this program will be those stated in the method or defined by the project manager. The corrective actions are likely to be immediate in nature and most often will be implemented by the analyst or Project Manager; the corrective action will usually involve recalculation or, reanalysis. Alliance's ongoing corrective action policy is described here.

14.1 Immediate Corrective Action

Specific QC procedures and checklists are designed to help analysts detect the need for corrective action. Often the person's experience will be more valuable in alerting the operator to suspicious data or malfunctioning equipment.

If a corrective action can be taken at this point, as part of normal operating procedures, the collection of poor quality data can be avoided. Instrument and equipment malfunctions are amenable to this type of action and Alliance's QC procedures include troubleshooting guides and corrective action suggestions. The actions taken should be noted in field or laboratory notebooks but no other formal documentation is required, unless further corrective action is necessary. These on-the-spot corrective actions are an everyday part of the QA/QC system.

Corrective action during the field sampling portion of a program is most often a result of equipment failure or an operator oversight and may require repeating a sample event. When equipment is discovered to be defective, it is repaired or replaced and a correction factor is established as per the EPA method. If a correction factor is unacceptable the run is repeated. Operator oversight is best avoided by having field crew members audit each others' work

before and after a test. Every effort is made by the field team leader to ensure that all QC procedures are followed. Economically, it is preferred to repeat a sample during a particular field trip rather than return at a later date.

Corrective action for analytical work would include recalibration of instruments, reanalysis of known QC samples and, if necessary, of actual field samples.

If the problem is not solved in this way, more formalized long-term corrective action may be necessary.

14.2 Long-Term Corrective Action

The need for this action may be identified by standard QC procedures, control charts, performance or system audits. Any quality problem which cannot be solved by immediate corrective action falls into the long-term category. Alliance uses a system to ensure that the condition is reported to a person responsible for correcting it who is part of the closed-loop action and follow-up plan.

The essential steps in the closed-loop corrective action system are:

- Identify and define the problem.
- Assign responsibility for investigating the problem.
- Investigate and determine the cause of the problem.
- Determine a corrective action to eliminate the problem.
- Assign and accept responsibility for implementing the corrective action.

- Establish effectiveness of the corrective action and implement it.
- Verify that the corrective action has eliminated the problem.

Documentation of the problem is important to the system. A Corrective Action Request Form (shown in Figure 14-1) is filled out by the person finding the quality problem. This form identifies the problem, possible causes and the person responsible for action on the problem. The responsible person may be an analyst, field team leader, department QC coordinator or the QA Director. If no person is identified as responsible for action, the QA Director investigates the situation and determines who is responsible in each case.

The Corrective Action Request Form includes a description of the corrective action planned and the date it was taken, and space for follow-up. The QA Director checks to be sure that initial action has been taken and appears effective and, at an appropriate later date, checks again to see if the problem has been fully solved. The QA Director receives a copy of all Corrective Action Forms and then enters them in the Corrective Action Log. This permanent record aids the QA Director in follow-up and makes any quality problems visible to management; the log may also prove valuable in listing a similar problem and its solution.

Corrective Action Request Form No. _____

Originator _____ Date: _____

Person Responsible for Replying _____ Contract Involved: _____

Description of problem and when identified: _____

State cause of problem, if known or suspected: _____

Sequence of Corrective Action: (If no responsible person is identified, notify QA Manager immediately. Submit all CA forms to QA manager for initial approval of CA.)

State Date, Person, and Action Planned:

CA Initially Approved By: _____ Date: _____

Follow-up Dates: _____

Final CA Approval By: _____ Date: _____

Information copies to:
RESPONSIBLE PERSON/DEPARTMENT QC COORDINATOR: _____

QA MANAGER: _____

DEPARTMENT MANAGER: _____

Figure 10-1. Corrective Action Request Form.

15.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

15.1 Internal Reports

For this assignment, The Alliance Laboratory Services Coordinator will prepare written weekly reports on QC activities for the Lowell Division Manager and the Corporate QA Director. These reports detail the results of quality control procedures, problems encountered and any corrective action which may have been required.

All Corrective Action Forms are submitted to the QA Officer for initial approval of the corrective action planned and a copy is provided to the Lowell Division Manager. All system audit reports are provided to the Program Manager, Lowell Division Manager, and Alliance Technologies' Chief Operating Officer.

15.2 Reports to Client

Each data transmittal will contain a summary of QA/QC activities; this summary will include:

- Estimates of precision, accuracy and completeness of reported data;
- Reports of performance and system audits;
- Quality problems found; and
- Corrective actions taken

The final report will include a section summarizing QA/QC activities during the program. The Program Manager, Laboratory Analysis Coordinator and the QA Director will participate in preparing this section.

SITE HEALTH AND SAFETY PLAN

FIELD SAMPLING ACTIVITIES
WHITE BRIDGE ROAD ASBESTOS SITE
NEW VERNON ROAD ASBESTOS SITE
MEYERSVILLE, NEW JERSEY

ALLIANCE TECHNOLOGIES CORPORATION
Boott Mills South
Foot of John Street
Lowell, Massachusetts 01852
(508) 970-5600

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TABLES

FIGURES

A. INTRODUCTION

This Health and Safety Plan (HSP) has been developed to provide all Alliance personnel participating in field sampling activities at the New Vernon Road Asbestos and White Bridge Road sites in Meyersville, New Jersey with information which will be used to ensure their personal protection from exposure to asbestos or other health hazards while engaging in field activities.

Alliance field personnel will adhere strictly to this site-specific HSP as it pertains to all onsite activities. In addition, Alliance personnel are bound to follow all the requirements of Alliance's Corporate Health and Safety Policy. Any subcontractor participating in the site activities will be required to follow this HSP, as well. Subcontractors may choose to use their own health and safety plan as long as it is at least as stringent as the Alliance HSP.

B. SITE BACKGROUND AND PROJECT DESCRIPTION

The New Vernon Road and White Bridge Road sites are both satellite sites of the National Priorities List (NPL) Asbestos Millington Dump Site in Morris County, New Jersey. During the 1960s and 1970s, refuse consisting of loose asbestos, along with broken asbestos tiles and siding, was disposed of at these sites by National Gypsum Corporation. Preliminary sampling by EPA has revealed that chrysotile asbestos is present in soils at levels up to five percent.

The Agency of Toxic Substances and Disease Registry (ATSDR) has verbally issued a preliminary commentary stating that the sites pose an imminent health threat and is calling for medical monitoring of the onsite residents, and additional sampling. ATSDR is in the process of issuing a Health Advisory which calls for the relocation of affected residents and the abatement of the risk posed by asbestos contamination.

Alliance has been selected to assist EPA in the completion of a comprehensive sampling and analysis program in order to characterize the extent of contamination at these two sites. The field sampling effort will consist of site setup, surveying/site grid, geophysical investigation, subsurface boring, subsurface and surface soil sampling, and air monitoring (for health and safety concerns only). Borings will be conducted using hand augers and soil sampling shovels and scoops. To supplement the hand augering effort, arrangements will be made to access a drill rig which will be used to sample from points where greater depth will be required or where hand augering is unsuccessful.

A description of each of the two sites of concern is provided below.

New Vernon Road Site Background:

The New Vernon Road Site is located in Meyersville, NJ. It consists of approximately 30 acres of land off New Vernon Road. The site was operated as a corn and dairy farmstead from 1945-1980. During the late 1960s, refuse from the National Gypsum Company was landfilled at the site. These operations continued for approximately 2 years. The refuse consisted of loose asbestos fibers, along with broken asbestos tiles and siding. The landfilling operations were conducted within two specific areas within this site. A small depression in the westernmost section of the property adjacent to the road was landfilled first. Operations were then transferred to a larger depression in the middle of the property. The landfilling operations consisted of trucking and dumping the fill material. The fill material was then bulldozed into place, graded and seeded. Presently there are two homes on the site. The land is being used to support a tree service business.

The majority of the site is grassy and well maintained. The fill area is approximately 200-300 feet long and is cluttered with tree trunks and logs. The driveways on the property were recently paved with asphalt. The property is occasionally accessed by large trucks. In addition, a shed on site was found to contain asbestos on its dirt floor surface. This shed is being removed (week of 10/15/90). In general, the probability of asbestos fibers being disturbed by wind or contact and becoming airborne, appears to be high.

White Bridge Road Site Background:

The White Bridge Road site consists of approximately twelve acres of land off New Vernon Road and is bordered by the Great Swamp National Wildlife Refuge to the east and south, and by private residences to the north and west. There are two residents living onsite and eighteen horses reportedly boarding in the stables at the site. There is a large grazing field for the horses in the center of the site which takes up the majority of the property. Situated in the northern portion of the grazing field is a pond, approximately 100 feet in diameter. In addition, there is a riding track approximately 250 feet long by 125 feet wide. There are five other residences on White Bridge Road (between New Vernon Road and the Great Swamp) within approximately 700 feet of the site.

A release of asbestos to the soil, through past disposal and filling operations, has also occurred at the White Bridge Road site. From 1970 until 1975, landfilling operations were performed at this site by the National Gypsum Corporation. The refuse included asbestos tiles and siding. Both the dirt roadway on the eastern edge of the property, and the horse riding track to which it leads, are covered with pulverized asbestos tile that becomes dusty during dry periods. In addition, there are areas of asbestos fill on the southeastern portion of the property and at the edge of the grazing field. Further west into the field, chips are visible at the base of the crabgrass and along the southern end of the riding track 6 to 12 inch pieces of asbestos tile are visible at the surface. The probability of asbestos fibers being disturbed by the wind or contact, and becoming airborne, appears to be high.

C. ALLIANCE PERSONNEL AND RESPONSIBILITIES

Project Manager

Michael White

The Project Manager has primary responsibility for the implementation of the Health and Safety Plan. For reasons of practicality, the Project Manager will delegate this authority to the Onsite Health and Safety Coordinator for onsite work, although the Project Manager may carry out this function on site.

The Project Manager is responsible for communicating site requirements to all field personnel. In addition, the Project Manager is responsible for appropriate changes made to the Health and Safety Plan as suggested by the TES 6 Health and Safety Officer.

TES 6 Health and Safety Officer

The TES 6 Health and Safety Officer (HSO) is responsible for the review of the procedures outlined in the site specific Health and Safety Plan. The HSO is responsible for communicating any project health and safety deficiencies to the Project Manager for resolution. Where appropriate, the HSO will communicate the project's health and safety status to the Corporate Health and Safety Officer. The HSO will assist the Onsite Health and Safety Coordinator in determining proper health and safety procedures or alternative work practices, as necessary.

Corporate Health and Safety Officer

Debra Gardner

The Corporate Health and Safety Officer is responsible for the overall performance of the company's health and safety program. The Corporate Health and Safety Coordinator will assist the HSO with respect to the technical resources required for proper administration of the project health and safety plan. Alliance also employs a Certified Industrial Hygienist who is responsible for final review and approval of all site safety plans.

Onsite Health and Safety Coordinator

Susan Carboni

The Onsite Health and Safety Coordinator (OHSC) is responsible for maintaining all safety and operating procedures outlined for Alliance personnel on site. The OHSC will be reporting directly to the Program Health and Safety Officer. The Onsite Health and Safety

Coordinator will seek direct guidance from the Program Health and Safety Officer on all health and safety matters. The OHSC is responsible for maintaining a high level of safety awareness, coordinating with local emergency authorities, checking for compliance with applicable federal and state health and safety regulations, and selecting the appropriate personal safety equipment. The OHSC will be responsible for all personal and Alliance equipment decontamination.

Field Team Members

All field team members are charged with the responsibility of following this Health and Safcty Plan. Field team members are required to:

- Know and observe all plan safety requirements, warning signals, and emergency procedures.
- Know and observe all EPA, Alliance, and OSHA safety requirements, procedures and policies.
- Remain current in safety practices and procedures by regular participation in Agency safety training.
- Use any safety equipment required by the facility being inspected in addition to that required by EPA, OSHA, and/or Alliance.
- Use safety equipment in accordance with EPA and OSHA guidance and labeling instructions.
- Maintain safety equipment in good condition and proper working order.
- Dress appropriately for each project activity, including protective clothing, if appropriate.
- Report unsafe acts or unsafe conditions to the Program Health and Safety Officer as soon as they become aware of them.
- Report any changes in work conditions or deviations in procedures outlined in this Health and Safety Plan to the Program Health and Safety Officer.

D. ALLIANCE HEALTH AND SAFETY PROGRAM

Medical Surveillance

All Alliance personnel who will be entering the New Vernon Road and White Bridge Road sites have undergone an extensive medical examination by a board certified occupational physician. The purpose of this evaluation program is:

- To assess the health status of personnel prior to work, including ability to use respiratory protection.
- To evaluate and provide medical care for personnel in the event of a work-related accident or illness.
- To identify any adverse health effects resulting from hazardous work, and to determine employee fitness for future work assignments.

Based on the examination, the physician identifies any medical restrictions which would affect an employee's ability to safely perform his/her job. If no restrictions are imposed, the physician certifies the employee as capable of full participation in the work program. The Alliance medical surveillance program requires an annual followup examination to ensure the continued fitness of the employee for future work activities. Furthermore, supplemental testing will be administered on an as-needed basis following an unusual exposure to a high level of contamination at a work site.

Training

Alliance requires all field team members to participate in a minimum of 40 hours of OSHA safety training sessions outlined in 29 CFR 1910.120. The subjects addressed include: regulatory concepts, toxicology, first-aid, material safety data sheets, field monitoring, personal protection, site-entry procedures, sampling and decontamination, documentation, and emergency response.

In addition, Alliance will conduct an asbestos seminar for all field team members, prior to their involvement in on-site activities. Topics covered will include:

Health Effects of Asbestos Exposure
Identifying Asbestos-Containing Materials
EHSD Personal Protective Equipment Selection

Bulk Sampling Procedures
Decontamination Procedures
Documentation and Quality Assurance Procedures

E. GENERAL SAFETY REQUIREMENTS

Daily safety meetings of the Alliance Onsite Health and Safety Coordinator or his/her designee and field team members will be held to update site conditions, including temperature, wind velocity and direction, humidity, and precipitation. Changes in the level of personal protection required will be discussed, in addition to special safety requirements for assigned work activities.

The general safety rules listed below apply to Alliance personnel present at the White Bridge Road and New Vernon Road sites.

- Eating, drinking, and smoking are prohibited on site.
- All onsite personnel must wear protective clothing appropriate for the designated level of protection and decontaminate before entering clean areas.
- Personal motor vehicles are prohibited on site.
- Emergency eyewashes will be located near the work site during sampling activities.
- Do not kneel or sit on the ground.
- Do not walk through puddles, pools, or mud, if any.
- Onsite personnel will follow the "Buddy System" during site activities.
- An adequately stocked first-aid kit will be maintained by the OHSC at the work site.
- All accidents, injuries, or possible exposures will be reported to the Program Health and Safety Officer immediately. A copy of the accident report form is attached (Attachment D).

F. HAZARD ASSESSMENT

A hazard assessment must be performed so that the HSP can best provide comprehensive protection against all potential hazards and specific protection against individual known hazards. The hazard assessment shall be continuously modified as new information becomes available and as site conditions change. The potential on-site hazards include but are not limited to: surface debris, rusted metal, buried debris, falling debris, unstable ground and slope failure, buried wastes, and the release of asbestos fibers to the air.

Asbestos Hazards

Based on recent analytical data revealing elevated levels of fibrous asbestos (2 to 5 percent chrysotile) in the surface soils, the potential for a serious release of asbestos to the air exists at the White Bridge Road and New Vernon Road sites. Dust samples collected from the houses on the site revealed levels from < 1 to 2 percent chrysotile.

The asbestos appears to be most exposed and friable on the riding track at the White Bridge Road site, and on the driveway and in the shed at the New Vernon Road site. The driveway and shed at the New Vernon Road site have recently undergone steps toward remediation. EPA observed that when the riding track is very dry due to lack of rain, the material was easily made airborne with ordinary walking.

Asbestos is designated as a CERCLA hazardous substance under 40 CFR Part 763 if it is friable. A material is friable if it can be crumbled with hand pressure and is therefore likely to emit fibers when disturbed. These fibers act more like gas than dust because of their small size, shape and lightness. It is possible that some of the asbestos at these sites is friable. The health hazards associated with asbestos exposure, and exposure limits are presented in Table 1.

Physical Hazards

Hazards associated with site activities are varied and include vehicle/pedestrian collisions, heavy equipment, fire, materials handling, slips, trips, and falls; and cuts and punctures. Excessive temperatures, hot or cold, are not anticipated. If extreme weather conditions are encountered, site workers will be briefed on the signs/symptoms of heat and cold stress.

Preventive steps will be taken to reduce the physical hazards associated with intrusive activities (soil boring). Alliance personnel will keep at a safe distance from drill rigs and will wear ear protection during said activity. As a general rule, ear protection should be worn if site workers are unable to hear one another. OSHA requires ear protection if noise levels exceed 85 decibels over 8 hours, 90 decibels over 4 hours, 100 decibels over 1 hour, and no exposure to continuous or intermittent noise shall exceed 115 decibels.

TABLE B-1. ASBESTOS EXPOSURE HAZARD SUMMARY

Contaminant	Physical Description	Route of Entry	Health Effects	Target Organ	First Aid	Exposure Limits[a]
Chrysotile, amosite crocidolite, tremolite, anthophyllite, actinolite	Fine, slender flaxy fibers	Inhalation Ingestion	Asbestosis, mesothelioma, lung cancer other cancers	Lungs	Eye: Wash with large amounts of water	OSHA PEL: 0.2 fibers/cc NIOSH REL: 0.1 fiber/cc OSHA action level: 0.1 fibers/cc

Source: NIOSH Pocket Guide to Chemical Hazards, February 1987.
[a] 8 - hour time weighted averages.

Biological Hazards

Other hazards such as weather conditions, snakes, rats, insects, and poison ivy will be evaluated on a daily basis by the OHSC.

Chemical Hazards

No known chemical hazard exists at either site.

Lighting

For any sampling activities performed indoors, adequate lighting will be provided to ensure the safety of site workers. A minimum of 5 foot-candles is required.

G. MONITORING PROCEDURES

Alliance will collect a minimum of three ambient air samples per day whenever soil samples are being collected. Alliance field personnel will be working in teams of two. Constant flow personal air samplers and cassette filters will be worn by one team member for each team collecting soil samples and will be kept running while the person is in the exclusion zone.

H. WORK ZONES

Alliance will utilize its mobile laboratory to serve as headquarters for sample dispatch and onsite coordination. Work zones to include the clean zone, the contamination reduction zone, and the exclusion zone will be established.

An area will be set aside within the work zone for decontamination. The type of decontamination will be based on the level of protection required.

I. LEVELS OF PROTECTION

A determination of the level of respiratory protection to room during field sampling activities will be made on a daily basis by the OHSC. The OHSC will consider the results of personal and area air monitoring, prevailing weather conditions, the nature of the materials being sampled and other pertinent information in this determination. At a minimum, a half-face, air-purifying negative-pressure respirator with HEPA filters will be required to be worn during the soil sampling effort. As conditions warrant, more protective respiratory devices will be required to be worn.

Table 2 summarizes OSHA's requirements for respiratory protection devices based on the asbestos PEL of 0.2 fibers/cc and protection factors assigned to the classes of respirators.

TABLE B-2. RESPIRATORY PROTECTION

Maximum airborne asbestos concentrations and (associated protection factors)	**Required respirator**
Not in excess of 2 f/cc (10 x PEL)	Half-mask air-purifying respirator equipped with HEPA filter.
Not in excess of 10 f/cc (50 x PEL)	Full facepiece air-purifying respirator with HEPA filters.
Not in excess of 20 f/cc (100 x PEL)	Any powered air-purifying respirator (PAPR) with HEPA filters. (Full face mask half face mask, loose fitting (or hood) mask).
Not in excess of 200 f/cc (1,000 x PEL)	Full facepiece supplied air respirator operated in pressure demand mode.
Greater than 200 f/cc (>1,000 x PEL) or unknown concentration	Full facepiece supplied air respirator operated in pressure demand mode and equipped with an auxiliary positive pressure self-contained breathing apparatus, or pressure demand SCBA.

Level C protection will be required for all site activities within the contamination reduction and exclusion zones.

Level D

- hard hat
- chemical resistant gloves-latex surgical
- boots-steel toe and shank
- eye protection (safety glasses or goggles)
- ear protection - during drilling
- coveralls

Level C

- hard hat
- outer gloves
- inner gloves-latex
- tyvek coveralls (double-suit)
- chemical resistant outer boots
- inner boots-steel toe and shank
- ear protection - during drilling
- full face air purifying respirator - with HEPA filter - or PAPR
- joints between coveralls and boot covers or gloves sealed with tape.

Level B (necessary if airborne levels exceed 200 f/cc)

- pressure-demand, self-contained breathing apparatus
- Tyvek coverall with expanded back for SCBA
- outer gloves
- inner gloves-latex
- chemical resistant outer boots
- inner boots-steel toe and shank
- ear protection - during drilling
- long cotton underwear
- joints between coveralls and boot covers or gloves sealed with tape.

J. DECONTAMINATION AND DISPOSAL

This section summarizes procedures for decontamination of personnel and equipment.

Personnel Decontamination

Field personnel must undergo decontamination prior to leaving the site as outlined below.

Level D

- brush soiled boots to remove soils
- rinse gloves with water and dispose in plastic bag
- rinse safety glasses with water
- remove coveralls and store in plastic bag

Level C

All decontamination will take place on a plastic sheet so that all contaminants may be contained for proper disposal.

Step 1

Place all equipment used or originating from the restricted zone on a plastic sheet and decontaminate.

Step 2

Mist individual (suit and mask) with water. Wipe off mask with disposable towel. Deposit towel in properly labelled asbestos disposal bag.

Step 3

Remove gross contamination from boots using brushes, detergent, and water.

Step 4

Rinse boots with clean water.

Step 5

Remove boots; set aside in clean area.

Step 6

Remove outer suit and gloves and deposit in a properly labelled asbestos disposal bag.

Step 7

Mist inner suit with water.

Step 8

Remove inner suit and deposit in a properly labeled asbestos disposal bag.

Step 9

Remove respirator. Deposit used filter cartridges from respirator in a properly labeled asbestos disposal bag.

Step 10

Place the respirator in a bucket filled with respirator sanitizer.

Note: All waste water from the decontamination procedure will be collected and disposed of in a known contaminated area onsite.

Level B (If Level B protection is required, a three-stage decontamination procedure must be followed)

Personal hygiene is the final step for each decontamination procedure. All team members who have worked on site should shower after proceeding through the onsite decontamination of outer clothing.

All disposable clothing, equipment, and cleaning tools will be treated as hazardous waste and appropriately disposed. Contaminated water and cleansing liquids will be collected, stored, tested, and treated as hazardous waste if necessary.

Equipment Decontamination

Alliance expects the decontamination area at each site to be located at the interface of the Clean and Exclusion Zones. This area will be referred to as the Contaminant Reduction Zone. The precise locations and boundaries of these zones will be identified by the PM, FTL, and OHSC prior to initiating any field activities at either of the sites.

Any heavy equipment (drilling rigs) utilized at each site will be decontaminated in one decontamination area. The drill rig(s) will be soap and water washed prior to vacating the site within the Contamination Reduction Zone.

Sampling equipment such as hand augers, split-spoons, pans, spatulas, and other implements that come into contact with samples, will be decontaminated using a wipe and rinse procedure. Initially, the equipment is thoroughly washed and scrubbed in the laboratory during the mobilization effort. Alconox and tap water will be used in the initial cleaning, followed by a thorough tap water and DI water rinse. The equipment is then air or oven-dried, and then wrapped in aluminum foil or clean polyethylene sheeting for transport. Onsite decontamination (immediately following use in sample collection) will be conducted at the sampling location by first wiping down with a wet-wipe, and then spray-rinsing using a hand-held sprayer and tap water.

Disposal Methods for Decontamination Wastes

All waste material from decontamination procedures (i.e., - Tyveks, respirator cartridges, boots, gloves, wet-wipes, toweling, cuttings from the drill rig, etc.) will be placed in bags specifically labelled as asbestos-containing wastes. These bags will then be sealed and placed in the dedicated dumpster which will be present at each site, within the Contamination Reduction Zone. All cuttings from hand augered soil borings will be returned to the soil in the same order from which it was collected. These dumpsters will be transported to a landfill licensed for asbestos-containing wastes by a licensed transporter in accordance with state and Federal regulations.

K. EMERGENCY SERVICES

Emergency Resources	Telephone Numbers
Police:	
Stirling Police Department	(201) 647-1800
Ambulance:	
(Contact Police Department)	(201) 647-1800
Fire:	
Stirling Fire Department	(201) 647-4444 (Emergency Line)
Hospital:	
Morristown Memorial Hospital	(201) 540-5007
Center for Disease Control	(404) 454-4100 (24 hours) or (404) 329-2888
National Response Center	1-800-424-8802
Superfund Hotline	1-800-424-9346
Chemtrec	1-800-424-9300

TRAVEL ROUTE TO NEAREST MEDICAL FACILITY:

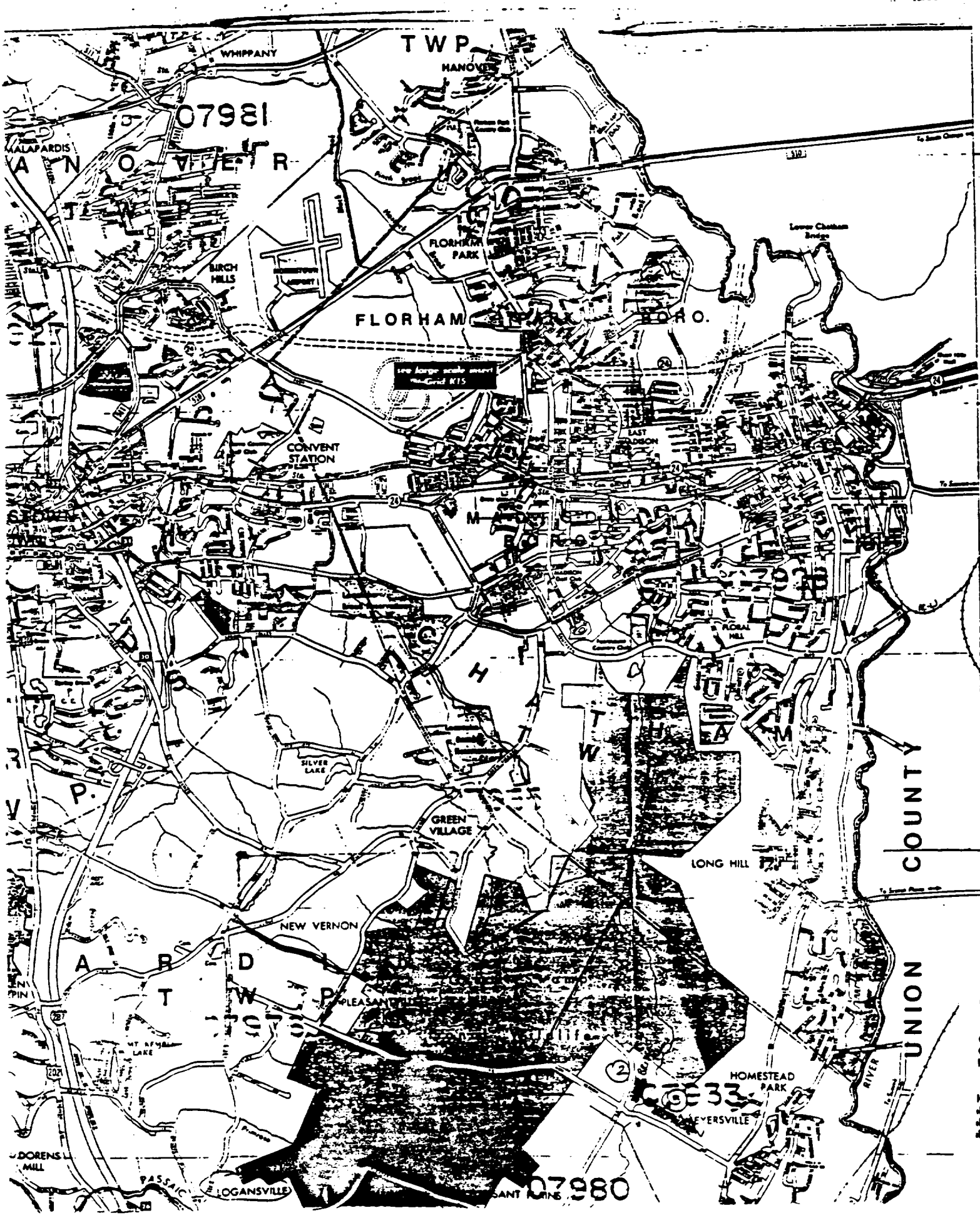
Turn right out of the driveway onto New Vernon Road which becomes Long Hill Road. Proceed to the end. At the stop sign, turn right onto Lee's Mill, Logansville Road which becomes Blue Mill Road. Turn left onto James Street and follow signs to Route 287N. Get on Route 287N and take the first exit to Route 24, Madison Road. Follow the blue hospital signs to the hospital.

Mileage: 19.3 miles
Time: Approximately 22 minutes

L. EMERGENCY PROCEDURES

Before commencing any operations, the OHSC will familiarize him or herself with potential hazards. Evacuation and rescue plans will be determined by the OSHC and discussed with all field personnel before any onsite activity commences.

Emergency phone numbers will be posted along with instructions dealing with various emergency situations such as explosions, fires, spills, or contact injuries.


TWP
WHIPPANY
HANOVER
07981
A N O V E R
FLORHAM PARK
BIRCH HILLS
FLORHAM
CONVENT STATION
LAST
MADISON
FLORAL HILL
SILVER LAKE
GREEN VILLAGE
LONG HILL
NEW VERNON
A R D
T W P
PLEASANT
HOMESTEAD PARK
MORRISTOWN
DORENS MILL
PASSAIC
LOGANSVILLE
07980
UNION COUNTY

M. REFERENCES

1. *Work Plan, Field Sampling and Analysis at the Asbestos Dump Site, Passaic, NJ"*, prepared by Alliance Technologies, October 12, 1990.

2. 29 CFR 1910.120, *Federal Register*, Vol. 54, No. 42, March 6, 1989, Hazardous Waste Operations and Emergency Response (OSHA).

3. U.S. Department of Health and Human Services, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH/OSHA/USCG/EPA), October 1985.

4. U.S. Environmental Protection Agency, *Standard Operating Safety Guide*, July 1988.

5. U.S. Department of Health and Human Services, *NIOSH Pocket Guide to Chemical Hazards*, February 1987.

6. ACGIH, *Threshold Limit Values and Biological Exposure Indices for 1988-1989 (ACGIH, 1988).*

7. *Removal Site Evaluation for White Bridge Road Asbestos Millington Dump Site (NPL), Meyersville, New Jersey"*, memo to the file prepared by Nick Magriples, On-Scene Coordinator, September 11, 1990.

8. *Removal Site Evaluation for New Vernon Road Asbestos Millington Dump Site (NPL), Meyersville, New Jersey"*, memo to the file prepared by Nick Magriples, On-Scene Coordinator, September 11, 1990.

ATTACHMENT A

SITE SAFETY LOG

Project Name:

Project Number:

Date: Time:

Weather:

Site operations today:

Alliance personnel onsite:

Types of hazards encountered (chemicals, heights, machinery, etc.):

Incidents/Accidents/Unusual monitoring results or occurrences:

Comments:

Completed by:

*Site Log may be used in lieu of this form. However, information listed above must be entered in Site Log.

ATTACHMENT B

Project Name:	White Bridge Road Asbestos Millington Dump Site
Location:	Meyersville, New Jersey
Project Leader Firm:	Alliance Technologies Corporation
Address:	Boott Mills South Lowell, MA 01852
Telephone:	(508) 970-5600
Date of Preparation:	17 October 1990
Review:	David Cogley, Ph.D.
Project Manager:	Michael White
Onsite Coordinator:	Susan Carboni
Program Health and Safety Officer:	Arlene Levin, M.P.H.
Approvals:	
Company Health and Safety Coordinator:	Debra Gardner_____ Date:

ATTACHMENT C

Safety Plan Acceptance

I, _____, have received a copy of this Health and Safety Plan. I have read the plan, understand it, and agreed to abide by it.

Signed _____

Date _____

ATTACHMENT D
INJURY REPORT FORM

600 WASHINGTON STREET, BOSTON, MASSACHUSETTS 02111

EMPLOYER'S FIRST REPORT OF INJURY

(To be filed only for those injuries resulting in five lost work days.)

Please print or type legibly. Incorrect, illegible or incomplete forms will be returned.

I. EMPLOYEE DATA	1. First Name / Init. / Last Name		2. Social Security Number	FOR OFFICE USE ONLY DO NOT WRITE IN THIS COLUMN
3. Home Address (No. & Street, City, State, Zip Code)			4. Home Tel. #	Stamped Date Received:
5. Marital Status ☐ Single ☐ Married	6. Sex ☐ Male ☐ Female	7. Date of Birth (MM/DD/YY)	8. No. of Dependents	
9a. Regular Occupation	9b. Occupation when injured (if different)	9c. No. of days on non-regular job when injured.		Board Number -------
10. How long in your employ? yrs. ____ mos. ____	11. If a juvenile, was an employment certificate or permit on file? ☐ Yes ☐ No			
II. EMPLOYER DATA	12. Employer Name		13. E.I.N. NUMBER	E ____
14. Office Address (No. & Street, City, State, Zip Code)			15. Telephone #	V ____
16. Name and Address of Insurance Company (not agent) providing your Workers' Compensation Coverage				R ____
17. Nature of Business or Article Manufactured		18. Industry (S.I.C.) Code		
III. EMPLOYEE WAGE DATA	19. Piece or Hourly Worker ☐ Piece ☐ Hourly	20. Hourly Wage $ ____	21. # Hours worked per day ____	22. Days worked per week ____
23. Provide estimated value of meals furnished the employee each week and estimated weekly value of any lodging, fuel, etc. furnished $ ____			24. Gross Aver. Weekly Wage $ ____	
IV. OCCUPATIONAL INJURY OR ILLNESS DATA	25. Date of Injury (MM/DD/YY) / /	26. Was injured paid in full for this day? ☐ Yes ☐ No		
27. Date Disability began (MM/DD/YY)	28. Date of Fifth Work Day Lost: (MM/DD/YY)	29. Estimated length of Disability in days ____ days		
30. Injury Type Code ____	31. Primary Body Part Code ____	32. Secondary Body Part Code ____		

33. Other injury descriptors (Check all that apply):
- a. Injury direct result of a single accident
- b. Injury resulted from cumulative condition
- c. Injury represents a chronic/recurring disease
- d. Injury resulted from toxic/hazardous substance

34. Address or Location where injury/illness occurred	35. On employer's premises? ☐ Yes ☐ No	36. Employee's Department ____

37. If injured has returned to work.
a. Date of Return (MM/DD/YY) / / b. Weekly Wage $ ____ c. At what occupation? ____

38. To whom and when was injury/illness reported?	39. If injured has died (MM/DD/YY) enter date of death / / /

40. Name and Address of Witnesses

41. Name and Address of Physician	42. Name and Address of Hospital

V. ACCIDENT INFORMATION

43. Describe fully how accident/injury occurred.

ABD 001 1450

Signed by ____ Title ____ Date ____

Please file one copy with the Department and one copy with your insurer within five days excluding Sundays and holidays, from date in box #28. Failure to comply with reporting requirements may result in a fine.

Injury Type and Body Part codes are listed on reverse side.